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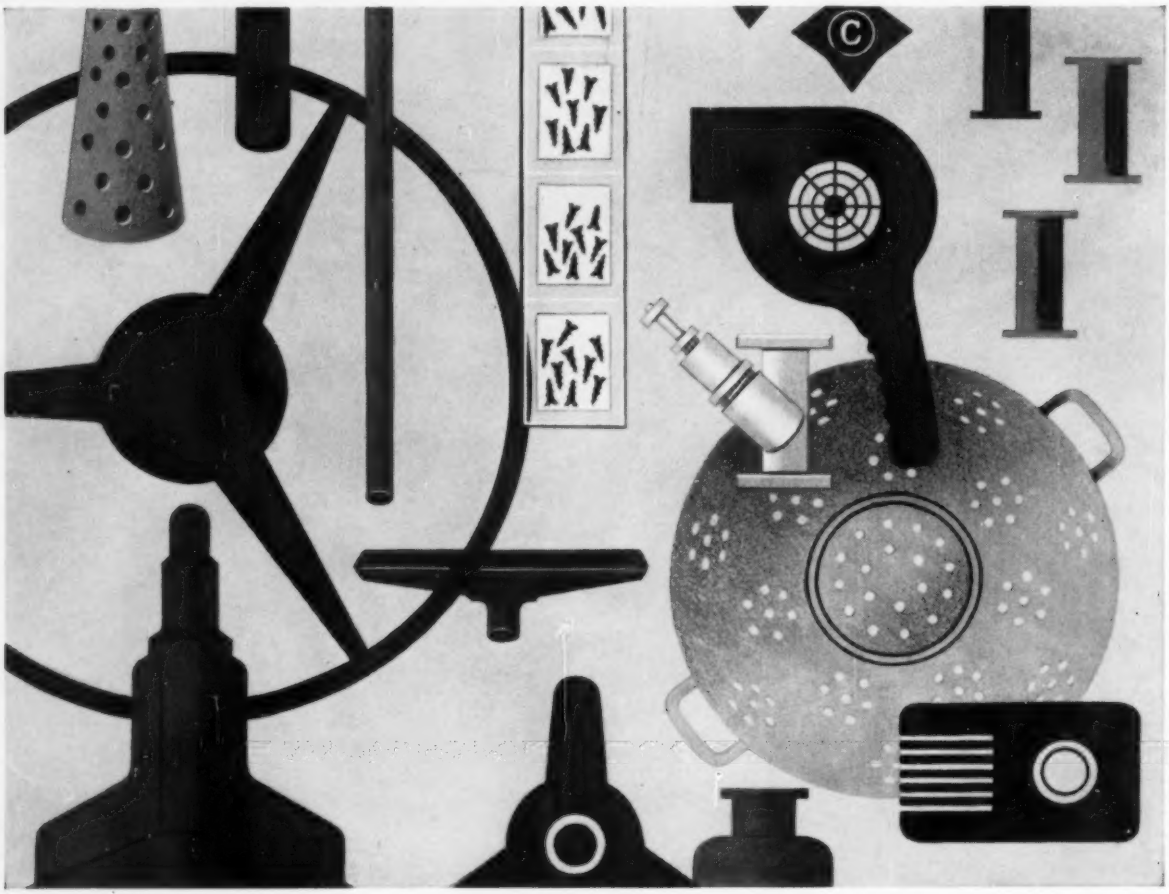

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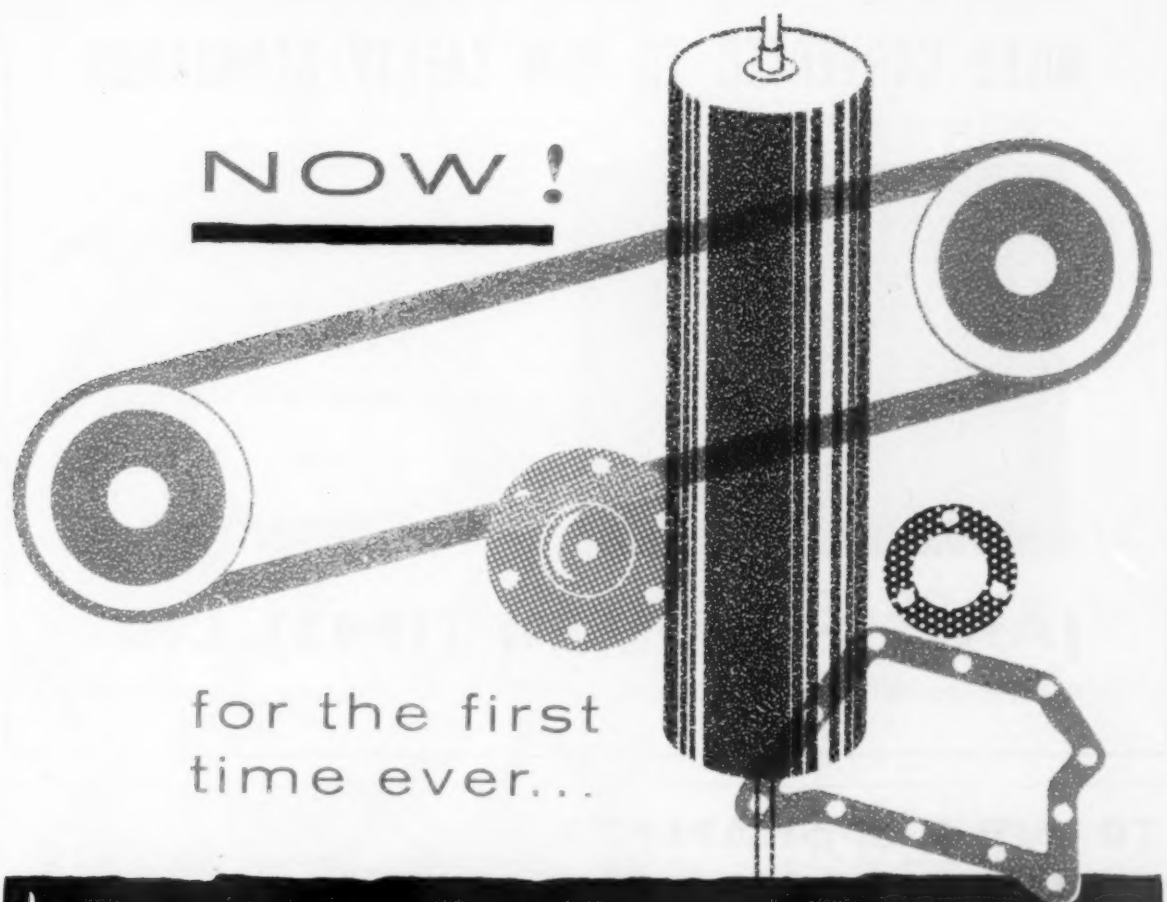

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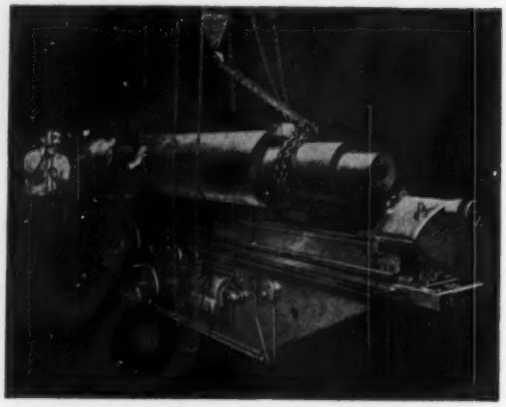

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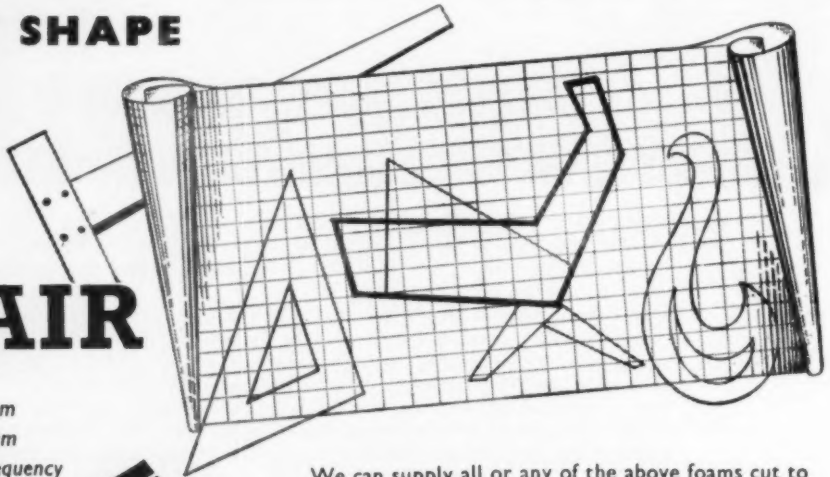

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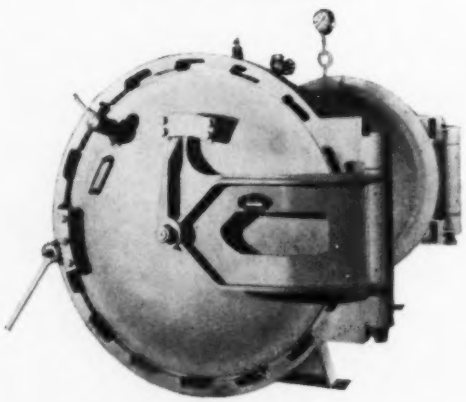

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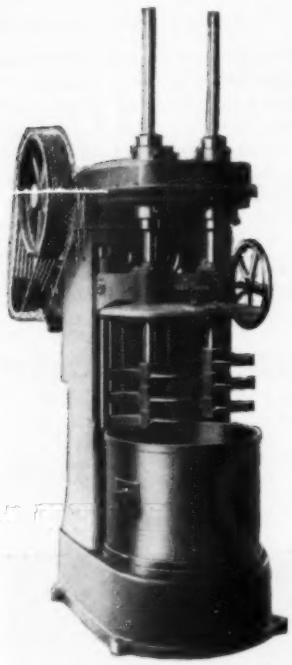

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Rubber Journal and International Plastics

Volume 139 | Price 1s. Post free 1s. 4d. | No. 8

IN ITS 77th YEAR

August 20 1960

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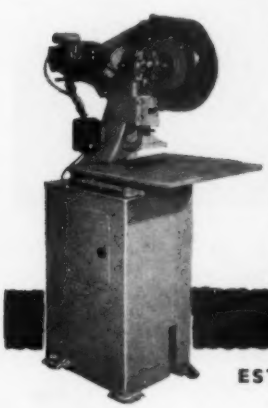

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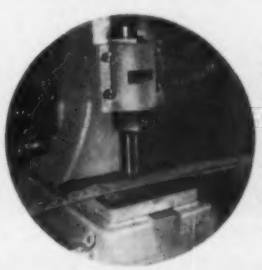

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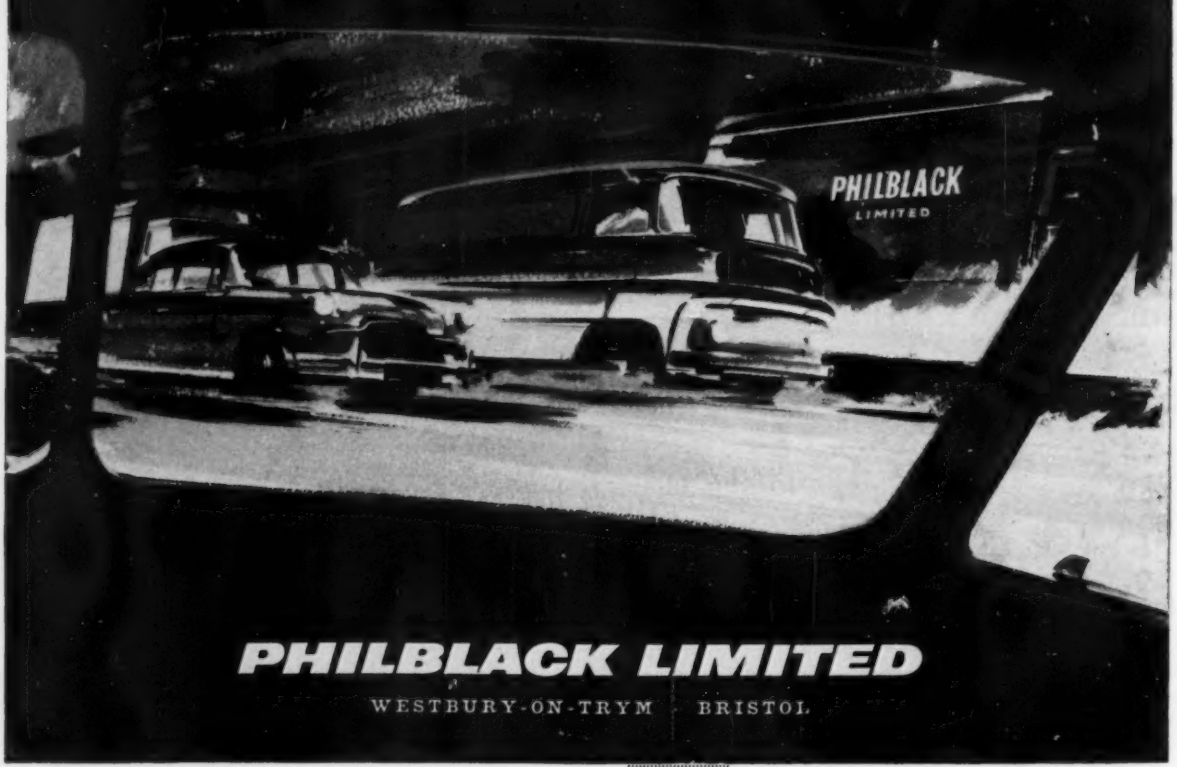

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NOTES of the WEEK

Substitution Consequences

THE substitution of man-made materials for natural products has led to consequences that stretch from changes in social habits to shifts in the general pattern of international trade. An important article in the August issue of the *Barclays Bank Review* analyses some of the aspects of the rise of substitute materials. (The pitfalls in the word substitute are recognized: ' Plastics generally are often looked upon as substitute materials, but their uses are so manifold that they have outgrown this description . . .')

Substitution of one material for another may take place for a number of reasons. Prices of man-made materials tend to fluctuate less than those of natural products, which means that forward planning can be done more accurately and stock losses avoided—synthetic rubber is a prime example here. Costs may be cheaper, although this is not necessarily so. Reinforced plastics have replaced metal in a number of applications where the capital outlay is greater, but corrosion-resistant properties mean that the material is cheaper in the long run.

Substitution by a man-made product, the article points out, has wide economic effects and generally results in a strengthening of the UK's trading position. This may not only be a decrease in imports, but also an increase in exports. For example, many materials which were imported—such as shellac from India used for gramophone records—have been largely replaced by polystyrene and PVC, which now, of course, figure high up on our export list. The UK's trading position—and that of other industrial nations—is strengthened at the expense of the producers of the natural product. Although the price of natural rubber is at a high level and consumption continues to meet production, clearly Malaya and Indonesia would occupy a much more important place in the world today if synthetic rubber had not been produced.

Changes On The Map

SUBSTITUTION also makes the industrial geography sections in school textbooks out of date. Cotton mills in Lancashire are closing down, while factories are being opened in Northern Ireland, Gloucester and elsewhere for the production of man-made fibres. Oil is also making big changes on the industrial map. Whereas industry tended to be centred near the coal fields, now sections are moving within easy reach of oil. Thus the petrochemical complex at Grangemouth has been set up near the refinery on Isle of Grain, I.C.I.'s latest complex is at Severnside where there are port facilities for oil tankers, and one of the main reasons for siting the International Synthetic Rubber Co.'s plant at Hythe was the presence of the giant Esso refinery at Fawley which feeds it with butadiene. This tendency will certainly be affected, however, by the growth of pipelines such as the projected Fawley-Severnside pipeline.

So far, substitution in the UK has not gone on at the same rate as in USA. The result has been that US subsidiary companies are playing a considerable part in the production of substitute materials in this country. If the UK is to maintain its industrial position, more attention than ever will have to be paid to research and development on substitute materials. It is not a question of a bigger volume of research so much as a channelling of the effort where it would be most useful.

Not So Slouchy

'NO matter what else you say about them, you can never accuse the —— of being slouches when it comes to promoting their export trade—for it is design and eye appeal that sells your goods, as the wily —— know very well.' What would you fill the blank with? Germans? Americans? You would be wrong. The word is British. We indulge in so much self-criticism about our exports, that it is refreshing to find that, quite frequently, we are our own worst critics.

The sentence appeared in a South African newspaper, and referred to a touring display of mounted photographs of the 1960 Design Centre Awards. These awards include a set of melamine plates and Vynide PVC-coated fabric, while rubber and plastics are featured as parts of many other products.

In case the thought arises that it is one thing to sell to the Commonwealth and another to Europe, then we ought to say that a display of the actual awards met with an equally good reception in West Germany last month. An exhibition in Stuttgart drew a good attendance from representatives of design and industry. Further north, UK goods were shown in a Helsinki department store. Perhaps the most searching test, however, will come in two days' time, when a display of the awards opens in the leading Italian department store, La Rinascente, in Milan.

Since the war Italy has set a pace in style and design which has extended from fashions and fabrics to kitchen utensils and furniture, so the awards will be compared with an exacting standard. However, the success met so far shows that UK goods, when they are well designed, produced and marketed, have no need to be ashamed of themselves on the export market. When we do drop some of our reserve in the English Channel and push our goods forward we do make an impression—and sell. In fact, as the South African journalist indicated, we are not so slouchy after all.

NEWS *Briefs*

PLASTICS LAMINATES EXPANSION PROGRAMME
DUNLOP SHARES IN FRANKFURT—NEW ITALIAN
RESINS—GOODYEAR STRIKE—LATEX TAKE-OVER

●**Australia** — Reichhold Chemical Industries Australia, and the US company Hercules Powder, have registered a company in Melbourne with a nominal capital of £A1m. The two companies have joined in a venture to produce resin-based compounds at Springvale, Victoria.

●**United Kingdom** — Distillers are among a number of companies whose shares, it has been mentioned, may be quoted in Paris. A spokesman for the company said, however, that no steps were being taken to obtain a quotation on the Paris Bourse. I.C.I. and Courtaulds shares were introduced on the Bourse recently. Arrangements are said to be in progress for introducing Pechiney on the London Stock Exchange.

●**West Germany** — Deutsche Bank in Frankfurt announced that trading in the ordinary shares of Dunlop (UK) commenced on August 15. No official quotation in Frankfurt has been asked for by the company: the statement means that depository receipts representing Dunlop shares will be dealt with 'over the counter.'

●**Italy** — Laboratori Italiani Ricerche Chimiche, of Milan, jointly owned by Snia Viscosa and Ledoga SpA, has developed two new resins with higher temperature resistance than either polystyrene or acrylates. Named 'Dialux A' and 'Dialux C,' they are derivatives of itaconic acid, a product of sugar fermentation. It is expected that they will find use as glass substitutes.

●**United States** — Negotiations for the sale of Southern Latex Corporation and its subsidiaries to International Latex Corporation of Dover, Delaware, have been completed. Southern Latex Corporation will continue to operate as an autonomous company with no change on its management and policies.

●**Hungary** — Hungary is showing two plastics machines in her display of industrial machinery at the Damascus International Fair, which opened on August 15. One is the VP Super moulding machine, which works on the vacuum principle. The other is the Her-Bor 150 plastic welder, which welds tear-proof plastic foil.

●**Japan** — The Japan Synthetic Rubber Co.'s Yokkaichi plant will go on stream shortly. Investment involved is of the order of Yen 2,500m. and the annual capacity is expected to be 45,000 tons.

●**United States** — Westinghouse Electric Corp. has announced plans to expand facilities for manufacturing high pressure decorative plastic laminate by 75% at its Micarta Division plant in Hampton, South Carolina. The expansion programme will add new equipment including a laminating press costing over $2m.

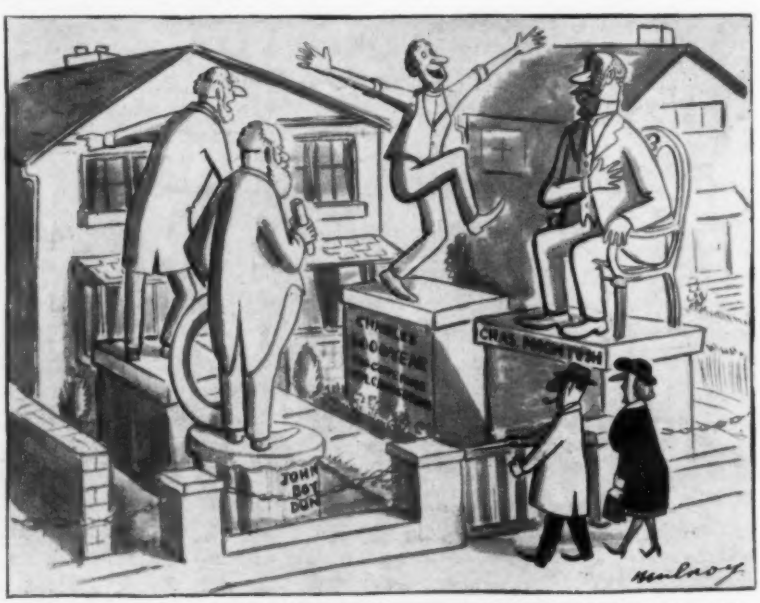
●**Holland** — The Argentine steamer *Rio Diamante* (5,383 tons) anchored at Helder on August 15 with flames and clouds of dense smoke bursting from her rubber-laden holds. It was some hours before the fire was under control. The cargo is said to consist mainly of tyres.

●**United States** — Union Carbide Plastics Co. has announced that it has reduced its prices on low density polythene. Reductions range up to 5 cents per lb. and apply to practically all types of low density resins and compounds. In making the announcement R. K. Turner, president, said that the action was being taken as part of the company's long-range marketing plan to broaden the use of polythene.

●**United Kingdom** — To encourage and advance chemical research, the chemicals division of Union Carbide Ltd. is making a grant of £2,150 per annum for three years to Southampton University. Later it will consider an extension of this grant which will provide for a research studentship and a fellowship in synthetic organic chemicals.

●**United States** — The United Auto Workers Union have come out on strike at Goodyear Aircraft Corporation's plant at Akron, affecting 2,300 workers. Negotiations for a new contract have been going on since June.

●**Switzerland** — A new plastics manufacturing company has been established called Thermopal AG. Registered at Leibstadt, it has a capital of S.Frs.1.8m. The company will make a variety of products, particularly for the building trade.



'Whatever you do, don't get him talking about the Rubber Industry.'— 498

First UK Butyl Plant

ESSO TO BUILD £4.3m. PLANT AT FAWLEY

ESSO Petroleum is planning to construct a butyl rubber plant at their Fawley refinery. It will be the first butyl plant in the UK and the fifth in the world. Cost will be about £4.3m., and it will have an annual capacity of 30,000 tons.

The company says that it expects the plant will take between two and three years to build.

At present the UK consumption of butyl runs at approximately 7,500 tons a year, so the capacity will not only cater for UK consumption but will leave a considerable surplus for exports to Europe. All supplies at the moment are obtained from Canada and USA.

The World's First

The world's first butyl installation was Esso Standard's plant at Baton Rouge, Louisiana. This was followed by Polymer Corporation's plant at Sarnia, Canada. The other two butyl plants are at the Baytown Refinery, Louisiana, and in France, at Fort Jerome.

US production of butyl for the first five months of this year was 40,000 tons. Canada's production for the first quarter of 1960 was 7,500 tons.

Its low permeability to air is one of the factors that has led to inner tubes being a major outlet for butyl. It is also used as a general purpose rubber in electric cables, conveyor belts, tank linings and rubber components.

Dundex to Sell Dunlop Adhesive

A new company called Dundex, of 69 Wigmore Street, W.1, has been formed to sell an industrial rubber-based adhesive made for it by the Chemical Division of Dunlop.

In one-gallon cans, the adhesive will sell at 39s. 6d. a gallon to industrial users with another line called 'Farmer's Adhesive' at 42s. 6d.

CEYLON: STATEMENT SOON

The Ceylon Government is shortly to make a statement setting out the conditions under which foreign capital would be permitted to operate in Ceylon. This follows a policy statement that plantations and estates will not be nationalized.

This statement is expected to lead to an increase in estate investment, which has slowed down in recent years.

The Government has instituted three measures to stem the drain on foreign reserves — bank rate has been raised from 2½% to 4%, heavier duties have been placed on imports, and the rate of interest on loans covering import transactions has been raised.

Butyl Rubber Symposium

R. L. Zapp, a pioneer in the field of butyl rubber, is to take part in a two-day symposium on the subject.

It will be held at the National College of Rubber Technology on September 22 and 23.

Some of the topics included will be 'Relations between Structure and Properties'; 'Development of Faster-curing Butyl Polymers'; 'Significance of Heat Treatment'; 'Various Aspects of Compounding'; 'Weathering of Butyl Vulcanizates' and 'Dynamic Properties of Vulcanizates.'

A panel discussion has also been arranged at which Mr Zapp and other experts will deal with factory and other problems met during the use of butyl rubbers.

Integration at Halex

NEW 'PRESS-BUTTON' £41,000 PLANT

MACHINERY valued at over £160,000 is now being installed in a new building at Highams Park, London, E.4, where the Halex division of British Xylonite is increasing its production capacity.

Housed in a new £41,000 building recently completed, the set-up is geared for full production in October when three shifts of twelve men each will operate the ten machines installed.

The new plant will produce larger injection moulding units for consumer and industrial markets, and the company says that it is part of a long-term scheme for Halex division to integrate into larger production units.

The Highams Park factory was previously restricted to many small buildings because of the fire risk danger involved in the extensive use of celluloid. Until this new development the number of small production centres in the 66-acre site had reached ninety-nine.

New injection moulding machines for the plant have cost £100,000. Other equipment valued at over £60,000 will be transferred from other parts of the factory.

The injection moulding machines being installed are: one 105oz. Windsor AP200, one 72oz. Windsor AP120, two 60oz. Windsor 20/115, and three 16oz. Peco machines. The plant will also house three extrusion blowing machines which have been specially made and are based on designs of Pirelli, Shaw and Reifenhauser extruders.

Among the items to be manufactured are refrigerator interiors, a new household coal scuttle, and a new bathroom stool cum linen hamper.

Of Portal construction, the building has a floor space of 16,000 sq. ft. Clear spans eliminate unsightly and obstructive framework allowing installation of a travelling crane, which handles dies up to five tons weight, to run the length of the building.

Conveying System

A mechanical conveying system to bring the moulding powder to the machines at convenient level for charging the hoppers has also been incorporated. With this goes a system for powder storage at hopper height outside the main shop. This enables the storekeeper to load the conveyor easily by hoisting 5cwt. pallets (10 bags of powder) to the overhead runway with an electrical hoist block. As the pallet travels into the shop, the operator is able to move it to the desired spot for gravity feeding into the particular hopper simply by pressing a button.

The building cost £28,000, and is installed with services totting up to a further £13,000. Apart from the overhead crane and the 'catwalk' loader for the hoppers, there is PVC piping for compressed air (1½in.) and cooling water (4in.), which has been manufactured by Extrudex Ltd., also a member of the British Xylonite group.

ISR Makes a Million

FIRST DIVIDEND OF 4%

THE International Synthetic Rubber Co. reports a profit for 1959 of nearly a million pounds — £936,073.

Net losses sustained during the starting-up period (the plant first went on stream in March 1958 and reached full-stream output on July 20 1958) were £612,942. This results in a credit balance of £323,131, and the directors have decided to issue a first dividend of 4% tax free — £120,000.

£11,236 is written off formation and debenture issue expenses and £191,895 is carried forward.

The shareholders of ISR who will receive the dividend are: Dunlop — senior shareholder with just under half the capital — Goodyear Tyre and Rubber; Firestone Tyre and Rubber; Michelin Tyre Co.; Avon India Rubber Co.; Pirelli; BTR; North British Rubber and John Bull Rubber.

The capacity of the ISR plant at Hythe, Southampton, is rated at at least 70,000 tons a year; but the plant is now reported to be working at 30,000 tons above this capacity.

Silicofluoride Increase

I.C.I. has increased its production capacity for sodium silicofluoride (Na_2SiF_6) by over 50% with the commissioning of a new plant at Billingham.

Sodium silicofluoride which is, among other things, a coagulant for latex, has been in short supply in the UK for a number of years, and substantial imports have been necessary. I.C.I. now says that it is confident that it can produce enough sodium silicofluoride to satisfy all the UK demand.

100,000 GALLONS OF LATEX

Approximately 100,000 gallons of synthetic rubber latex have been shipped from Cleveland (Ohio) to Swansea aboard a UK ship, *Manchester Pioneer*. This is the largest cargo — 340 long tons — ever shipped from a Great Lakes Port via the St. Lawrence Seaway for an overseas destination.

Produced at the Akron synthetic plant of Goodyear Tire and Rubber Co., the latex was transported to Cleveland in 10 railroad tank cars — each with a 10,000-gallon capacity. At the dockside, the latex was pumped into four deep tanks aboard the ship.

Goodyear initiated export of synthetic latex through the St. Lawrence Seaway last August with a shipment of a 9,000-gallon bulk cargo to the UK.

Application Turned Down

The Board of Trade have decided not to fix an anti-dumping duty on ethanediol (monoethylene glycol) imported from USA.

An application to impose such a duty was made in March this year.

FINNISH PLASTICS CONVENTION

Polymers and co-polymers of PVC and their application in the building industry is the subject of one of the lectures to be given at the Finnish Plastics Association's international convention, to be held in Helsinki, from September 14-18. It will be delivered by Dr R. Murard (Pechiney)

Other lectures to be given include: 'Fabrication and application of styrene plastics today' (E. E. Merrill, Dow International); 'Uses of hd-Polythene' (Dr Karl Mehnert, Hoechst); 'Extrusion, its importance and uses' (Sven Jansson, AB Svenska Metallverken); 'New Aspects on Injection Moulding of Thermoplastics' (Hans Beck, BASF); and 'Recent Developments in Plastics' (Olle Jonsson, Ingenjörsfirman Omex).

Dow Activity in Japan

PROPOSAL FOR HIGH PRESSURE POLYTHENE PLANT

A PROPOSAL has been placed before the Japanese Government by Asahi-Dow Ltd., an associated company of Dow Chemical Co., for the construction of a polythene plant at Kawasaki, Japan.

According to this proposal, the new plant would use the high pressure polythene process developed by A. G. für Olefinpolymerization (AGFO process).

The principal licensor of the AGFO process, Scientific Design Co. Inc., New York, concluded recently a contract authorizing Dow's Swiss subsidiary, Dow Chemie A.G., to use the AGFO process for high pressure polythene in several countries on a non-exclusive basis for the benefit of its manufacturing subsidiaries and associated companies.

In the case of Japan, however, Scientific Design agreed that the licence be granted exclusively to Asahi-Dow.

Since the proposal also includes the use of Dow know-how in the fields of polythene manufacture and fabrication, Dow say that their associated company has been able to present a fully integrated proposal to the Japanese Government.

Asahi-Dow manufactures styrene, polystyrene and Saran plastics materials at plants in Kawasaki, Nobeoka and Suzuka City.

Important work is expected to be carried out on radiation polymerization of plastics, and on the radiation vulcanization of rubber, at the US National Bureau of Standards' new research facilities to be built at Gaithersburg, an artist's impression of which is shown above. What is said will be the world's most intense precision source of ionizing electron-beam radiation—a microwave linear electron accelerator—will be constructed for the new facilities by the High Voltage Engineering Corp.

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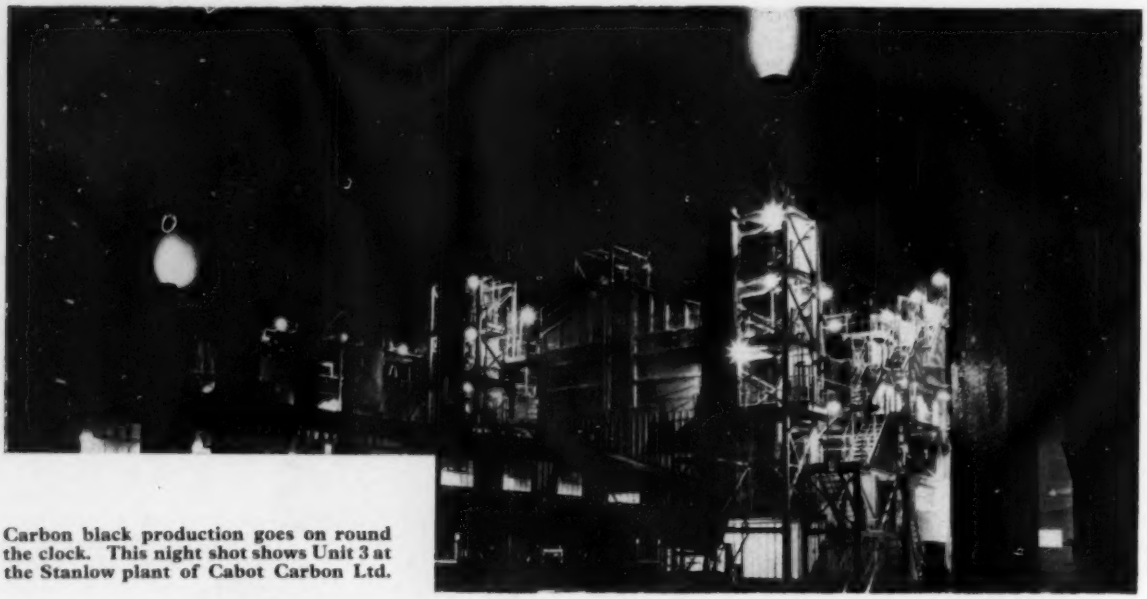


Carbon black production goes on round the clock. This night shot shows Unit 3 at the Stanlow plant of Cabot Carbon Ltd.

Black — with Flowers

CABOT CARBON PLANT AT STANLOW IS TEN YEARS OLD

THEY laughed when he planted geraniums—but not so much at the act as the idea, because the particular location had never before been considered as suitable for horticultural activity. Anyone who knows the dark clouds and the all-pervading dirt which for so long has been taken as inevitable wherever there are carbon black plants will find no cause for surprise in this. However, the geraniums grew and not only flowered, but remained clean. So did the white-painted edges of the pavements, another unheard-of innovation in such plants.

The 'garden' was introduced not long after the establishment of Cabot Carbon Ltd. at Stanlow, Cheshire, the first oil furnace carbon black plant to be set up in the UK. The 'gardener' was George Cash, American technical expert largely responsible for the planning and installation of the plant, and now the company's managing director.

This Spring, after ten years of remarkable progress, the company announced that they were producing a new range of blacks, the Regal blacks, developed by Cabot in the USA,* which may well prove to be an outstanding landmark in the long story of carbon black development.

* *RJIP* April 2 1960, pp. 518, 523.

Cabot Carbon Ltd. was incorporated in 1948 as a subsidiary of Godfrey L. Cabot Inc., of Boston, USA. Almost exactly eleven years ago, the first spade of soil was turned at the site on Merseyside and within fourteen months, in the second half of 1950, the first unit went on stream. It had a designed capacity of 8,000 tons a year and turned out the first high abrasion furnace black, Vulcan 3, ever to be made in the UK. After that, other units were added with astonishing frequency, 1951, 1953, 1955, 1956, 1957 and 1959, until today the capacity is ten times that of the original plant.

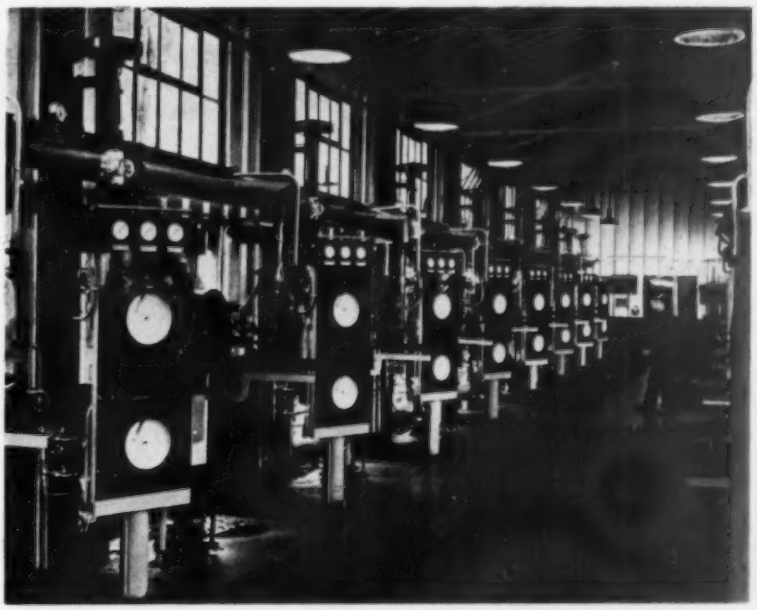
Process Up-to-Date

In the early years of the industry, from the latter part of the 19th century up to, in fact, 1943 when the oil furnace process entered commercial production, carbon blacks were for the most part manufactured by impingement. Of these the most important were those produced by the channel process and still known, of course, as channel blacks. The term 'channel,' by the way, derives very simply from the method used; natural gas being burned against channel iron suspended, and slowly reciprocated, above the natural gas flames. The method produces very fine particle size carbon blacks of a quality unequalled for many properties. Some of Cabot's new Regal range, however, are said to be virtually channel replacements as far as modulus, elongation and tensile strength are concerned and, besides having faster curing rates approaching that of HAF, to be superior in some others. Extensive tests with Regal 300, for example, have shown that it is a good lower cost replacement for channel blacks in natural rubber passenger tyre treads and truck tyre treads and Regal 600 may find application in oil-extended SBR passenger tyre treads.

It looks as though the time has arrived when carbon blacks can be made to order from the point of view of any combination of required properties. If this is true, it represents a significant break-through in manufacturing technique.

Progress has not, by a long way, been purely quantitative, nor has it been concentrated exclusively on process development, the improvement of the end product, or technical service. At Stanlow, and this is notable because of the very nature of the undertaking, it very definitely extends to working conditions. The geraniums, not now the only flowers, typify an approach to employee welfare that characterizes the high

efficiency vital to modern industry: certainly an essential in the increasingly competitive carbon black field. The object of the entire exercise is, after all, in effect at least, to collect smoke. In earlier plants — and in many contemporary ones — the buildings were painted black. This made much less noticeable the ever-present, almost unavoidable carpet of minute carbon black particles, with their incredible covering power, over roofs, floors, in short everywhere. At Stanlow, the buildings are silver and blue and the flowers are set off by green lawns. In the furnace control rooms, the floors are literally spotless and are kept that way by polishing machines specially requested by the operatives. The evident pride of men in their workplaces and their machines reflects not only the quality of the employee but the standard of the employer.



One of the furnace control rooms at Stanlow. The high degree of instrumentation is apparent, as is the remarkable cleanliness. *This and the two previous photographs are by Maurice Broomfield, F.R.P.S., F.I.B.P., London*

Highly Automated

Some 240 are employed at Stanlow, of whom 160 are production and maintenance workers. Production workers are divided into shifts as the plant works round the clock year in and year out. The relatively small numbers for the capacity of the plant indicate that something near full automation has been reached in the manufacturing operation.

For their employees, Cabot Carbon Ltd. provide clean working clothes as and when required—there is a laundry on the site—excellent washing and changing facilities and a modern canteen where four and five course meals can be had for 1s. 6d. There is also a delightful club house, built a mile or so away from the plant, which caters for social activities and sports. A cricket field is in course of preparation and there is a fine bowling green. The club is magnificently fitted out, with a bar, lounge and a billiards room in which the tables are so good that they are in demand for county and area competitions. The enthusiasm of the employees for these facilities can be judged by the fact that on one occasion last season ten cricket teams were fielded.

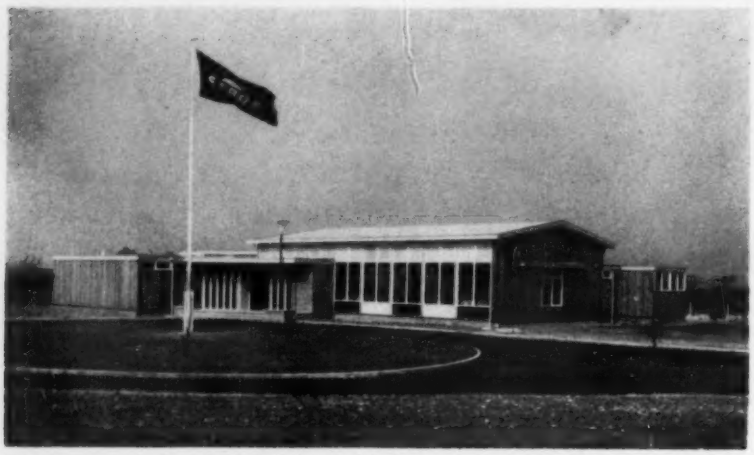
It is against this background that Cabot Carbon have expanded so greatly their Stanlow plant. After the initial grade HAF (high abrasion furnace) black, Sterling SO, and FEF (fast extrusion furnace) black was produced. A third grade, Vulcan XXX, was introduced in 1954. This possesses exceptional electrical conductivity in addition to its reinforcement properties and therefore finds use in anti-static rubber and plastic floor covering, in anti-static tyres and electrically conductive conveyor belts. A fourth grade, Vulcan 6, was later developed for extra high abrasion resistance, used for instance for the improved resilience at low loadings which it imparts to the tread of tubeless tyres, and a fifth grade, Vulcan C, a black having good electrical conductive qualities combined with the abrasion resistance of Vulcan 6. After these came other grades such as Sterling V, fluffy Sterling SO, fluffy Vulcan 3 and, a month or two ago, the Regal range.

Bag filter hoppers in which the secondary collection of black is made. The carbon black is put through compartmented rotary valves into the pneumatic conveying system

Three-section Process

The oil furnace process takes place basically in three sections; the furnace itself, a cooling and collecting section, and a pelleting and packing section. The furnaces at Stanlow are cylindrical, arranged in horizontal banks on each side of a control room. They average about 5ft. in length and utilize a surprisingly short reaction

section. Into these furnaces are fed oil, highly aromatic, received by pipeline from tankers berthed in the Manchester ship canal less than two miles away, gas and air. Complete combustion of the gas/air mixture provides heat for maximum cracking of the oil to carbon and hydrogen. This takes place at around 2,700°F.



The Company's Social Club is housed in this attractive building recently built a mile or so away from the plant. The grounds are spacious and include a cricket field and a bowling green. *Photograph by Stewart Bale*

The process is closely controlled and measured.

The properties of carbon blacks depend largely on particle size. This in turn is governed mainly by the molecular weight of the fuel and the amount of air admitted with the gas. Particle size decreases with increasing dilution of the raw material but the yield also decreases. Except in the case of the original unit, the primary collection system at Stanlow consists, for each unit, of four cyclone collectors in series. Here the particles of gas are agglomerated, some 85 to 95% of the carbon black being separated from the gas stream.

The hot gases, still containing black, pass then into a bag filter system. The bags, hundreds to each unit, are made of polyester resin/glass—a material giving a very much longer life than the Orlon previously used. The gases sweep upwards and through the glass fibre, depositing the remaining black on the inside surface. In what is really rather an elegant system, the cleaned gases are then blown back through the collector bags, dislodging the black which falls into hoppers and more cyclone collectors before reaching, via rotary compartmented valves, the pneumatic conveyor system which has already carried the black collected in the primary system. The high velocity airstream takes the black then to more cyclone collectors and a further series of bag filters where it is entirely separated from the conveying air.

This final separation takes place at the very top of the process building. From here the carbon black falls through hammer mills where — the only really noisy part of the operation — the agglomerated particles are pulverized. The black, now properly described as 'fluffy,' is then densified and proceeds to the pelletizing drums. With the exception of the original unit which uses a wet process, all units have these dry pelletizing drums, horizontal, 48ft. long cylinders which rotate to tumble the black into fine round pellets. These proceed to bulk storage hoppers from which the black goes by gravity to the packaging department for packing into the familiar multi-wall 25 or 50lb. paper bags, or direct to road tankers, or tote bins. The storage warehouses, which, incidentally, are as astonishingly clean as the rest of the plant, have space for millions of pounds of bagged carbon black.

Quality control of the product, daily tests of the different grades of black, is undertaken in the company's laboratory, which also analyses incoming raw materials, including the residual tail gas and even the boiler feed water. Product tests include measurements of surface area, colour value, tinting strength and dust content of the pellets. Vulcanized rubber-carbon black compounds are compared with standard blacks prepared by Cabot in the USA and thus serving as a standard in all Cabot plants — and tested for tensile strength, curing characteristics, abrasion resistance and so on. Technical service, too, comes under this department.

One effect of the great expansion of production at Stanlow has been that the laboratory has become somewhat cramped for space; an additional reason being that work is done there for some other Cabot plants and for Cabot customers throughout Europe. However, plans have been drawn up for a new laboratory building on which work is expected to start in the near future. If the envisaged schedule is adhered to, the Cabot plant at Stanlow will be even more of a show place.

REICHHOLD MALEIC ANHYDRIDE PROJECT IN FRANCE

Société Anonyme Reichhold Beckacite, France, an affiliate of Reichhold Chemicals (USA), will build a 400 metric ton per month (10,500,000lb. per year) maleic anhydride plant at Niort, Deux-Sevres, France. Scientific Design will design the plant and grant a licence for the use of the SD maleic anhydride process and the special catalyst required. Engineering services, as well as complete equipment and construction of the plant will be furnished by Société Française des Services Techniques S.a.r.l, Paris, France, a member of the SD Group.

Reichhold Beckacite is the second company in France to acquire an SD maleic anhydride licence, and will be one of the major producers of this chemical which is used in the manufacture of polyester resins. Compagnie Française des Matieres Colorantes (Francolor), France, was the first to acquire the complete design and process for a maleic anhydride plant from SD. This company has recently enlarged its maleic anhydride capacity at its Villers-St. Paul plant.

In 1954, Reichhold Chemicals Inc. was licensed to use SD's special maleic anhydride catalyst in their existing plant and any or all future plants built and operated solely by Reichhold in the United States.

Straws Dispenser

Two plastics materials are successfully combined in a new dispenser for drinking straws now being produced by Mendle Bros., Glamorgan. It consists of a coloured base moulded in Rigidex high density polythene, which provides rigidity and toughness, with a clear transparent cover of polystyrene, which protects the straws against dust and damage.

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Recent Work in Polymers

POLYCARBONATES — AROMATIC POLYMERS — GRAFT COPOLYMERS

AMONG the papers delivered at the recent international symposium of macromolecular chemistry held in Moscow was one on polycarbonates by a team of six Russian chemists, led by A. Ya. Yakubovitch. A summary of this, and two other symposium papers is given here.

Polycarbonates, in particular the most technically popular of them, poly-4,4′-bis(hydroxyphenyl)-2,2-propane carbonate, are distinguished by their thermal stabilities and may be processed at temperatures about 300°. The Russian paper deals with some chemical conversions of this polymer, taking place in solution and in the molten state.

Alcoholysis and Cleavage

In the fractional precipitation of the polymer from chloroform solutions by methyl alcohol, an enhanced yield in the low molecular fraction is observed, the latter continually forming even on repeated precipitation. If a small amount of methanol, insufficient to precipitate the polymer, is added to the chloroform solution a gradual fall in viscosity is observed, that does not occur in absence of the alcohol. The reaction is accelerated in the presence of hydrogen chloride. Such precipitants as acetone and petroleum ether do not cause this effect. Alcoholysis is a characteristic reaction of the polycarbonates, taking place at a relatively high rate.

An alcoholic solution of alkali will decompose the polycarbonate at room temperature and especially rapidly (within a few minutes) on boiling. In this way one may obtain with high yield bis-phenol, used for the synthesis of the polymer.

The melting of polydisperse polycarbonates (ca. 300°) in the absence of atmospheric oxygen leads to a very rapid (10—16 minutes) levelling of the molecular chain lengths and hence to decrease in polydispersity (according to fractional precipitation data), causing a corresponding fall in the viscometrically determined molecular weights. Such levelling annuls the harmful effect of the low molecular fractions on the properties of the material. At higher temperatures (350°) decarboxylation (evolution of CO_2) is quite marked and the formation of a certain amount of three-dimensional polymer may be observed.

Further Condensation

Polycarbonates prepared by the heterophase polycondensation of phosgene with phenolates, for instance, 4,4′-bis(hydroxyphenyl)-2,2-propane and containing hydroxyl and acyl chloride end groups, are capable of undergoing further polycondensation on heating to 270–300° for 30–60 minutes or more. Hydrogen chloride is evolved. As a result the mean viscometric molecular weight may increase 3–4 fold in comparison with the initial compound.

Additional polycondensation in the melt may also proceed by another pathway, without hydrogen chloride evolution but as the result of the elimination of a certain amount of 4,4′-bis(oxyphenyl)-2,2-propane on end group interaction. This reaction is catalyzed by small quantities of titanium alcoholates.

The high lability of the ester links in polycarbonates may also be illustrated by the interaction between these polymers and other esters, in particular with poly-bis(phenyl)-2,2-proprane$_6$ terephthalate (—OC_6H_4—$C(CH_3)_2C_6H_4$—O—CO—CH_4—CO—O), the reaction taking place without catalyst at temperatures above 300° results in a mixed polyestercarbonate with composite properties.

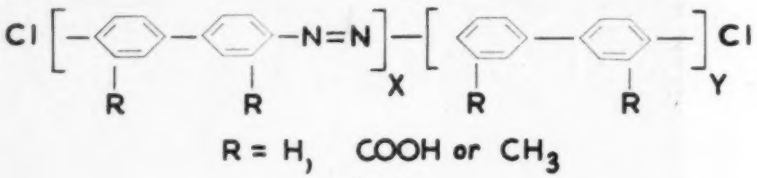

Fig. 1

Aromatic Polymers

Another Russian paper dealt with the synthesis and properties of some aromatic polymers. It was given by A. Berlin, B. I. Liogonky and V. P. Parini.

Multinuclear aromatic compounds are distinguished by considerable thermostability. In a number of cases they have been shown to be endowed with semiconductor properties. In view of this the development of a method of synthesis and investigation of aromatic polymers with a common system of conjugated bonds has both theoretical and practical interest.

Such substances have been synthesized by the authors on decomposing bisdiazo compounds by an ammoniacal solution of univalent copper, and also on decomposition of bisnitrosoacetates. In particular, 4,4′-bisdiazobiphenyl, 4,4′-bisdiazobitolyl, 4,4′-bisdiazobiphenyldicarbonic 3,3-acid and benzidine N,N′ bisnitroso acetate were employed.

On decomposition of the bisdiazo compounds a powder of orange to brown colour was formed, soluble in concentrated sulphuric acid and insoluble in most organic solvents. Analysis showed it to probably possess the composition shown in Fig. 1.

On average, one azo group is present for each 4–10 benzene rings and two chlorine atoms for each 10–20 rings.

The mean molecular weight determined for one of the carboxylated polymer specimens was found to be 3,000. On heating to 400° the polymer decarboxylates. At 450° decomposition sets in.

Viscosity curves of solutions in $\frac{n_{sp}}{c}$—co-ordinates exhibit an anomalous rise within the limits $c = 0.1-1\%$.

The concentration of unpaired electrons in the polymers was shown by the electron resonance method to be $\sim 10^{19}$g. Heating the substances leads to an increase in concentration of unpaired electrons by 1—2 magnitudes.

The spectra and X-ray diagrams of the substances were obtained. Evidently the formation of polymers from bis-diazo compounds is of a radical nature, leading to the formation of stable radicals of low activity. Low molecular fractions isolated from the polymers are fusible and soluble in benzene. They are capable of reacting with diethynylbenzene with the

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formation of non-melting and insoluble thermostable products.

Carboxylated polymers form salts with transition elements, that evidently are of the nature of intracomplex compounds with intermolecular cross-linkage.

Products of the decomposition of benzidine bisnitrosoacetate are in general similar to those resulting from bisdiazodiphenyl, but contain less unpaired electrons.

Graft Copolymers

A French paper by A. Chapiro dealt with the synthesis of graft copolymers from polymers subjected to the action of ionizing radiation.

The grafting of acrylonitrile on to polythene and polypropylene films preliminarily subjected to gamma-ray irradiation in air has been investigated, and is dealt with in the paper. The films were prepared under identical conditions with the same Ziegler catalyst and had the same thickness of 0.35mm. The results of grafting on to polythene are analogous to those obtained earlier for the case of high pressure polythene.

In the case of polypropylene, on the contrary, the reaction kinetics are of an entirely different character. All the conversion curves obtained on grafting acrylonitrile on to polythene have a linear region, whereas for polypropylene the shape of the curves changes with the radiation dose.

For small doses the curves have an autoaccelerative character typical for reactions taking place with a 'gel effect' whereas for enhanced doses the reaction proceeds at first at a high rate, but soon reaches a limit, after which grafting practically ceases. The amount of homopolymer (polyacrylonitrile) formed in the process of reaction is considerably larger in the case of grafting on to polypropylene than on to polythene. For polythene the rate of grafting is directly proportional to the radiation dose and varies with the intensity according to the equation: $V = KI^{0.85}$.

In the case of polypropylene the initial rate varies in proportion to the 0.65 power of the initial dose and to the 0.6 power of the intensity; for the given conversion the instantaneous rate on the contrary passes through a maximum, falling at higher doses.

The effect of the grafting temperature was investigated over the range 25 — 170°. The reaction with polypropylene is characterized by a single value for the activation energy — 9.5kcal/mole over the entire temperature range investigated. For low pressure polythene, again as in the case of the high pressure compound, two values were obtained: 9 and 17.5kcal/mole, for temperatures respectively above and below the melting point of the polymer crystallites.

The results were interpreted by the assumption that irradiation of polythene produces the macromolecular biperoxides ROOR whereas in polypropylene the hydroperoxides ROOH are formed. Furthermore it has been assumed that thermal degradation of the ROOH compounds requires less activation energy than that for the biperoxides.

From this it follows that the rate of initiation of grafting may be so high as to deplete the reaction medium of the monomer, resulting in decomposition of the peroxide centres without inducing the grafting reaction. In this way is explained, in particular, the shape of the conversion curves and the change in grafting rate with the dosage. The relative instability of polypropylene peroxides at ordinary temperature results in a marked decrease in the grafting activity of the polymer in the course of quite a short time.

The author presented a discussion of the mechanism of radiochemical peroxide formation in both polymers.

New Thermoplastic from Abbey

A CONDUCTIVE thermoplastic vinyl compound with outstanding electrical properties has recently become available. This material, known as Abbey 100, is produced by the Abbey Plastics Corporation, Massachusetts. It can be easily formed by extruding, moulding, calendering or laminating, using conventional equipment and the electrical characteristics are unchanged during processing.

The resistivity values are controllable over wide limits, the lowest being a rigid material with a resistivity of 1 ohm./cm.^{3}, the lowest available in the flexible form is 7 ohm./cm.^{3}, while values from 100 to 100,000 ohm./cm.^{3} in both flexible and rigid types are available.

This material was originally developed to replace the copper braiding in co-axial cables and in this application furnishes a more perfect shield and enables substantial economies to be achieved during processing. Copper braiding can be produced at approximately 150-200ft. per hour whereas Abbey 100 can be extruded at speeds of up to 800ft. per minute, at the same time doing away with the expensive and complicated copper braiding equipment.

Another interesting application in which the material has been tested with satisfactory results is for the conductor in the ignition wiring in cars. Conductors of Abbey 100 insulated with vinyl or Teflon have been shown to give improved performance, cause no corona and eliminate the need for suppressor type sparking plugs. Of some 100 test cars in use in the US with ignition cables made in this way, two are racing cars which have been competing very successfully in recent events. These cars operate on magnetos and the cables are carrying up to 60,000 volts.

There are many other applications for this material which deserve consideration and these include safety equipment of many types, hospital operating theatre equipment, aircraft de-icing, high voltage conductor shielding and anti-static devices.

Anderson's New Chairman

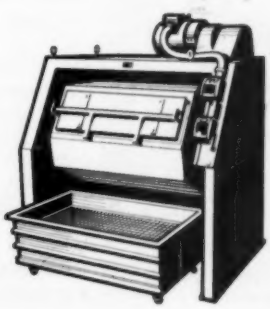
Col. L. A. Davies has been appointed chairman of Andersons' Rubber Company. He replaces Mr S. H. Elkington, who has resigned from the board. Mr V. L. Young has also resigned from the board.

Hycar synthetic rubber has been used by Fireproof Tanks, Portsmouth, to produce a 50-gallon drum which can be bounced off a lorry without fear of damage.

The casings of the 'Little Betty' sewing machines, made by E. M. Gheysens Ltd., of Dover, are now being moulded in Shell Chemical's GP grade of Carinex polystyrene

De-flash with 'Drikold'

With 'Drikold' and the Columbian International sub-zero tumbler you can raise production by de-flashing small rubber components quickly and efficiently. 'Drikold'—I.C.I. solid carbon dioxide—freezes the components and makes the flashes brittle, so that they break off as the drum of the tumbler rotates. Many mouldings—even complicated ones—can be de-flashed in this way. But if you're in any doubt, I.C.I. Technical Service staff will de-flash sample batches and advise you on your problems.



Sub-zero tumblers are available from Columbian International (Great Britain) Ltd., 116 Cannon Street, London E.C.4.

DK.333

Imperial Chemical Industries Ltd., London, S.W.1

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CPH/PR6/20

MEN *and* MATTERS

A Review of People and Events

by Peter Richards

FROM joining Dunlop nine years ago as secretary in the advertising department, allied group, thirty years old Miss Jean Roberts has now been appointed advertising manager of Semtex Ltd.

Educated at Hawes Down School, she was appointed an assistant with Dunlop in 1955 and during the next few years worked in connexion with Dunlopillo, Clothing, Footwear, Lastex and Sports Company. Miss Roberts transferred to Semtex as assistant to the former advertising manager, W. D. Knowles, at the end of 1958.

Mr W. D. Knowles, whose place Miss Roberts has taken, has been promoted to the company's central advertising department. He will continue to be responsible for the advertising activities of Lastex Yarn and Lactron Thread Ltd., the senior supervision of belting, GRG, hose and Semtex advertising, and will undertake other individual assignments.

Before he joined Dunlop Mr Knowles was advertising manager of the Peter Robinson Group.

Strictly Stag

Jean Roberts is something of a rarity. Dunlop have only one other woman executive: Miss M. Wallace, personnel officer of the materials and supplies division. In fact, in the polymer field as a whole, apart from isolated instances men make a clean sweep of the top positions. Distillers have no women executives — although they have one in the chemical division — and I.C.I.'s polymer management is strictly stag too, although again, in other fields women play a part.

But apparently the picture is changing — slowly. One personnel executive told me that the picture has to change. In his opinion a tremendous amount of talent is being wasted, and this is something that the country as a whole cannot afford.

Commercial Training

Turner Brothers Asbestos have joined the small number of companies who are running some form of commercial apprenticeship scheme. Most large industrial organizations operate a scheme for tuition in recognized crafts, but comparatively few cater for office workers, so that is a welcome move on Turner Brothers' part.

Organized facilities will be offered to public and grammar school boys to train for specific commercial qualifications, such as the Higher National Certificate in Commerce, and qualifications in the fields of work study, transport and cost accountancy.

The apprenticeship period will be about five years, and the company says that those successfully completing the course will, after a minimum probationary period of two years, be strong candidates for promotion.

Schemes like this should help to straighten out the haphazard nature of 'office training' — which often starts with the assumption that four years of licking postage stamps and distributing paper clips develops business acumen. They may even help to take some of the guesswork out of promotion decisions.

Perpetual Bone

I do not think that there are any statistics that cover such canine consumer essentials as rubber bones, polythene drinking bowls and PVC collars. This makes me wonder how many manufacturers whose production is geared to make two-legged products know of the potential market for four-legged ones.

According to the Post Office, the number of dogs — including hounds — licensed in Great Britain during the year ended March 31 was 2,721,285. This is quite a staggering figure and there must be room for new products and fresh ideas in this field. For example, I wonder if anybody has compounded rubber with meat extract in order that a dog may be given a perpetual bone? It would be intriguing to see formulations in which Bovril rubbed shoulders with china clay and stearic acid. This idea does, however, present one problem of production control. What testing machine would one use for flavour?

The Wandering Eye

During the last ten years advertising seems to have placed more and more emphasis on the point-of-sale. This is due, in a large part, to the emergence of the self-service store, when the pack must catch a wandering eye.

One of the experts at catching this eye is British Cellophane. Their quarterly publication *Merchandising Vision* — which is itself nicely packed in a cellulose acetate coated cover — always contains a number of interesting articles on packaging. The summer number contains one on the Danish concern Otto Nielsen Emballage A/S.

Scandinavia is said to have the most film-packaging conscious public in the world. Not even in USA can one find an equal variety of goods wrapped in transparent film.

Ronald Port (centre), sales manager of Vitafoam's bedding department, moved his section recently from Don Mill, Middleton, to larger offices at Glen Mill, Oldham. George Blunt (left) has been appointed assistant bedding sales manager, a position created as a result of the expansion. Danny Greer (right) has succeeded Mr Blunt as northern area sales manager

Otto Nielsen have a big modern plant, just outside Copenhagen, where they specialize in the printing of cellulose film and polythene film (which they also extrude), and their conversion into bags, pouches and wrappers. They also laminate films to produce various combinations such as Cellophane/polythene.

It is difficult to think of anything that this firm doesn't pack. Besides the usual biscuits, vegetables, frozen foods and so on, the Scandinavian taste for delicatessen foods has even led to the large scale packaging of semi-liquids such as sauces, mayonnaise, pickles and mustard. In fact the only thing I can think of at the moment that isn't film-wrapped is quails. But I daresay the day will come when we shall have quails, in aspic, in Cellophane.

Away with the Cream and Green

A feature of the new £41,000 building at Halex (see page 261) is a new look decor, which has been tried out in other parts of the Higham's Park plant.

A. B. Merriam, the works manager, said that wherever you looked there was the old traditional cream and green everywhere. 'So last year,' he said, 'we called in some colour consultants in an attempt to break with tradition, and over the next three years we will spend about £20,000 making every part of the factory look more attractive.'

Colour Increases Production

The result is that the new building hasn't got a spot of cream or green paint anywhere. Instead the roofing panels are in spruce green — a far cry from the traditional factory green — and end walls are in 'copper glow.' Side wall panels are in alternate shades of ash grey and pewter grey, and fittings relieve with paintwork in white and sunlight yellow.

How do the new colour schemes affect production? S. T. Smith, the works engineer, told me that where the schemes have been tried there has been a great elimination in the number of spoiled goods. In fact, Halex believe that the brighter colour scheme makes the staff more alert, co-operative, and much happier.

Four Star Rating

Vitafoam is one of the quickest growing firms in the rubber industry — and in fact it is already the biggest latex foam producer in Europe. Now the firm is beginning its autumn advertising campaign, the biggest it has ever undertaken.

Press shots will be 22 full-page colour advertisements in the glossy magazines, including Ideal Home and House and Garden, and half-pages in the TV Times.

The campaign includes television advertising during peak viewing times on the London and Northern networks. Three films have been prepared, including a 60-second colour cinema commercial which has received a four-star rating from Audio-Visual Selling.

* * *

Last year about £25,000 was handed out in prize money under I.C.I.'s suggestion scheme.

* * *

Sealdraught Ltd. are marketing a quickly fixed draught excluder. It consists of a strip of PVC at the bottom of which is bonded a strip of felt. The top of the PVC strip, on which is a backed adhesive, is attached to the foot of the door.

* * *

Dr Adalbert Farkas, assistant director of research, Houdry Process Corporation of Philadelphia, has been elected president of the International Congress on Catalysis. The third catalysis congress sponsored by this organization has been scheduled for 1964 in Holland.

* * *

J. D. Goddard, a director of Stenor Ltd., a member of the Firth Cleveland Group, is now in Canada on a fact-finding visit.

* * *

Barry Lawrence has joined Andrew Reid and Joan Cutting, principally to help on editorial publicity for the plastics, radio and electronic industries.

In his new post Mr Lawrence will be renewing contacts he made in the plastics field during five years as Press officer with E. K. Cole Ltd.

Question Corner — 131

(Second Series)

456. What principal methods are employed in the application of rigid polyurethane foams, and what factors affect the density?

(Answer next week)

Answer to Question Corner — 130

455. The surface of polythene must be treated to achieve good printing, and there are two ways in which this can be done.

In the heat, or flame method, the flame strikes the film as it passes over a water-cooled chromium plated drum. In this way one surface is subjected to a high temperature when the other, and the bulk of the film, is being chilled.

Various types of burner are available and for uniform treatment it is essential that the length of the flame remains constant. The burner is directed against the cooling roll at an angle so that the hot gases sweep over the the film. The flames may have different intensities, positions in relation to the drum, and distances from the drum. The optimum flame distance for best printability is different for different resins. It is important that the cooling roll dissipates the heat quickly.

The electronic method involves the film being carried round an electrically insulated metal drum and passing under a series of electric conductors carrying a high-voltage charge. The voltage jumps the air gap in arc discharges towards the drum. This surface treatment is carried out by the ozone and heat created by the discharge. As with heat treatment, this method involves oxidation of the film surface.

Electronic treating is usually carried out in line with film extrusion and before wind-up, but it can also be done as a separate operation.

(Another question next week)

Polly Ester Says . . .

'Extender — one of my old flames'

No less than 85% of the world's natural and synthetic rubber is mixed in Banbury Mixers.* Small wonder then, that Bridge-Banbury Mixers, embodying more than a generation of practical experience, research, and machine design, continue to play an almost indispensible part in the rising productivity of the ever-expanding rubber and plastics industries the world over.

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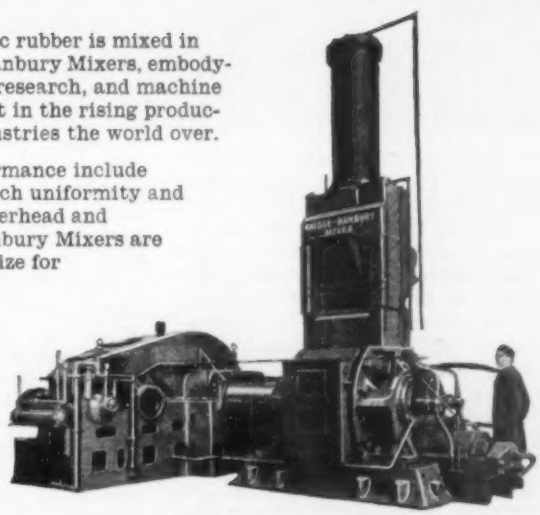

Fully detailed technical information is freely available on request.

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AMERICAN LETTER

News of the US Rubber and Plastics Industries

from Norman L. Hewitt

OUT of all the riches which the State of Texas exports to the rest of the Union, the least conspicuous are those surging clouds of natural gas transported in thousands of miles of pipeline buried beneath the vast reaches of prairie and farmland. Much of this pipeline was laid in the nineteen twenties, and has continued in service ever since. It is composed of 20ft. lengths of lap-weld steel pipe, and many of these lengths are coupled with natural rubber gaskets. Pressures of 175 to 250 psi are used to transport a sweet natural gas which is not dehydrated, and at times contains entrained petroleum liquids.

During the course of routine maintenance operations, a number of sections have been exhumed and examined. The 35-year-old gaskets are in remarkably fine condition. Beyond a very thin embrittled skin and some extruded edges of ¼in. or so there is no sign of deterioration. The hardness of the compounds, all non-black stocks, ranges from 60 to 75 Shore A. To obtain a basis for an estimate of life expectancy of the gaskets remaining in service, compression set was measured (22 hours at 70°C.) before and after accelerated ageing. The results were most interesting.

Whereas the set of the various gasket samples as received ranged from 40 to 60%, after an ageing period of one week at 70°C. the set in all cases decreased by approximately 30% from the original values. Such an improvement in elastic properties indicated that additional service up to a total of 50 or 55 years could readily be obtained from most of the gaskets. This appears to be another excellent example of the longevity of properly compounded rubber.

Cross-linked Polythene

If 'no news is good news,' the situation concerning cross-linked polythene ought to be especially promising. Laboratory investigation and publication have proceeded actively, but truly there is little to report on the commercial acceptance of this most interesting material.

There is little doubt that chemical cross-linking of polythene with peroxides works some very valuable physical changes. The low melting point of the original low density, high pressure polythene was — and is — a serious restriction on its use in many fields. Now the cross-linking techniques have raised the softening temperature from 110°C. to over 275°C.

Almost as important as the gain in temperature resistance has been the escape from environmental stress cracking (ESC). The appearance of this type of cracking failure in stressed polythene exposed to detergent solutions occurs with the dramatic suddenness of ozone cracks in elastomers. As explained by Boonstra and Bluestein in a paper at the Wire and Cable Symposium at Asbury Park, NJ, in 1958, the resistance of cross-linked polythene to this phenomenon arises not alone from the cross-linking itself, but from the dissipation of internal strains at curing temperature (320-350°F.) as well. More modest improvements are obtained in tensile strength and resistance to weathering solvents, and chemicals.

It is well to note that many of the differences between cross-linked and regular polythene arise from the presence of a substantial loading of medium thermal carbon black (50-200phr). Although this filler contributes to some of the physical properties, it appears that the major benefit conferred is one of lowered costs. (Regular polythene cannot be loaded with cost-reducing fillers without suffering an intolerable embrittlement.)

To complete this summary examination of the virtues of cross-linked polythene, one must also note two debits. The carbon black filler itself degrades the electrical insulating properties far beyond the low-loss characteristics which have long endeared polythene to the wire and cable industry. Thus, although wire and cable is still almost the only market, the particular insulations and cable jackets considered as likely spots for cross-linked polythene are those where neoprene — rather than regular polythene — is now used (such as line and drop wire).

The second drawback is the extra processing represented by curing (cross-linking). This is not the problem to a rubber manufacturer who is planning to replace neoprene that it is to the plastics processor who is going to replace regular polythene. The plastics man is accustomed to regard extrusion as his final operation; now he has to face the technical and economic factors of an additional process step. An illustration comes from the field of plastic pipe where recent trials with cross-linked polythene suffered from deformation during curing.

Who are now the parties most interested in cross-linked polythene in USA? The answer is best found by examining the ingredients in a typical general-purpose formula:

Polythene	100
MT black	100
Antioxidant	0.5
Peroxide	4

Now turn to the sources of these ingredients. All producers of the resin itself — and they are legion — have an obvious interest. However, the really active promotion has emerged from the suppliers of the peroxide curing agent and the carbon black. Two curing agents are in general use — Dicup (di-cumyl peroxide) of Hercules Powder and Varox (50% ditert-butyl peroxydimethyl hexane) of R. T. Vanderbilt. The latter company also supplies Thermax, a medium - thermal black. Godfrey L. Cabot is another supplier of thermal black (Sterling MT) who have been active in cross-linked polythene.

Looking beyond the suppliers, one finds the wire and cable companies; these represent the bulk of the present and foreseeable future market. But in addition to this group, there has appeared another whose interest is not at all understandable to a casual observer's first glance. This is the 'custom mixer,' a relatively new type of company which has lately become an important factor in the rubber and plastics industry.

At a recent technical meeting and demonstration held at the R. T. Vanderbilt laboratories at Norwalk, Connecticut, the largest delegation out of all the interested parties noted above was that of the custom mixing

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group. The custom mixer supplies compound only, mixed and formed to his customers' formula and specification requirement. Since the advent of cold feed extrusion in the wire industry (which made the immediate presence of mills and Banburys superfluous), much wire insulation and cable jacket compound has been produced in this manner. It is thus logical to find custom mixers allied with cable companies.

There is, however, another cause for the appearance of custom mixers at technical meetings devoted to cross-linked polythene, and here one finds an explanation of the unaccountably slow commercial appearance of this promising material.

It has been some time since the General Electric Company announced that the art of chemically cross-linking polythene, as revealed in US Patent 2,888,424, would be available through licence to all interested parties. Payment of royalties would, of course, have to be based on an examination of production and sales records of the licensee. Since these licensees would naturally be competitors of General Electric (in wire and cable), there has been a reluctance to make an agreement which would reveal intimate financial data to a major source of competition. There is, in fact, only one reported licensee at this time. Here is where the role of the custom mixer becomes clear.

He will be able to act as a buffer between General Electric and the competitive cable maker. All royalties will be paid by the mixer and absorbed into the charge to his customers. In this way, the cable maker's business records remain inviolate, while the opportunity to produce a new and exciting product is retained.

We will undoubtedly see more of cross-linked polythene; with the financial manoeuvring evidently at an end, the time of its full emergence is not far off.

Labour Problems

The collective bargaining agreements in the rubber industry contain a clause which allows a contract to be reopened at any time to negotiate wage increases. Should these negotiations fail to produce a new settlement within 60 days of the union's first official notice, the contract is subject to cancellation, and a strike may ensue. The United Rubber Workers during the first week of June set this procedure in motion with notices to each of the Big Five that wage increases were to be in fashion for 1960.

Bargaining began late in July in Cleveland, Cincinnati and Columbus, Ohio. Within an unexpectedly short period, and with no huffing and puffing, Goodyear and Firestone agreed to a 9½ cents hourly wage increase. These settlements affected some 39,000 employees, and it is expected that the balance of the rubber industries' 170,000 workers will soon have similar increases. Average rubber wages, prior to the latest raise, ranged from $2.58 to $2.90 per hour. Higher paying tyre operations account for the upper figures.

Shortly before these large scale activities got underway, an interesting minor skirmish occurred at Swan Rubber, the well-known hose manufacturer. A strike was called by the URCLPWA Union at Swan Rubber Co.'s Bucyrus and Carey, Ohio, plants on May 8 when no agreement could be reached to include Union Shop, dues check-off and arbitration provisions in a new contract. The Bucyrus plant continued to operate, and within a week the majority of employees had returned to work. The returned employees circulated a petition for a decertification election. The National Labor Relations Board held such an election on May 25, and the Union lost by a vote of 410 to 345.

At the Carey plant, the strike is still in progress. However, the plant continues to operate all shifts with 35% of the work force remaining on the job. The company is in the process of hiring replacements for those remaining out.

Meanwhile, at Passaic, New Jersey, the independent union (*i.e.* not affiliated with the AFL-CIO groups) of the Manhattan Rubber Division, Raybestos-Manhattan, Inc., called a strike of all employees on June 23. The wage reopening clause had been invoked only 10 days earlier, but in the light of a previous postponement of wage increases and the company's present refusal to negotiate until October, the union voted for the stoppage by a five to one ratio.

A settlement was finally achieved after six weeks of idleness. This situation must be considered against a background of slack local business activity throughout the first half of the year. A large number of the mechanical goods factories in this North Jersey area have been forced to lay off from 30% to 60% of their regular employees.

Natural Rubber Market

At the end of June, the General Services Administration presented a new incentive plan designed to accelerate the sale of the 400,000 long tons of natural rubber which had been declared excess to the requirements for the strategic stockpile. This amount is divided into 200,000 long tons of No. 3 RSS, 100,000 of No. 2 RSS, 70,000 of No. 1 RSS, and 30,000 of pale latex crepes.

The plan calls for GSA to sell bareback ribbed smoked sheets for ⅛ cents less than the market price. The stockpile sales for July responded with a 50% increase over those for June. However, at least part of this increase must be related to the lower market prices. Total sales from October 1959 to date from the stockpile come to 81,850 tons. To put the GSA transactions in proper perspective, this total figure should be compared to the average monthly consumption of natural rubber in the United States of slightly over 40,000 tons. Thus, the stockpile contribution amounts to about one-fifth of the total.

Under the terms of the disposal law, any substantial fall in the market price brings a curtailment in the amount of stockpile surplus which can be sold. These quotas come into effect at a 36 cents market and reach a complete restriction should the market price fall to 30 cents.

Meanwhile, each passing month sees an increase in the ratio of synthetic to natural consumed. (From 68.2% in April to 69.0% in May to 69.2% in June.) The six months' comparison shows 65% in 1959 and 68% in 1960.

Impact of the Compacts

With this nice bit of internal rhyming, the Journal of Commerce (NY) offered an explanation of the rapidly rising market for passenger car tyres. Shipments during the first five months of 1960 of 17,384,700 units show a 25% increase over those of the same period of 1959. Much of this increase is traced to the unexpectedly rapid acceptance of the new compact model cars which were produced by General Motors, Ford and Chrysler for the first time this year.

Although tyres for these small cars (small only in the American lexicon; they remain substantially larger than Europe's product) require slightly less rubber than regular sizes, the fact that over one-quarter of all passenger tyre production has gone on the compacts accounts for the increase. Firestone estimates that approximately 18,000 more tons of rubber will be used in tyres this year. Next year, there will be no change

Continued on page 280

Effects of Nuclear Bombardment

ASTM 63rd ANNUAL MEETING

CONSIDERABLE attention is being given today to the effects of nuclear radiation on engineering materials. Two papers describing studies of such effects on rubber were presented at a session sponsored by ASTM Committee D-11 on Rubber and Rubber-like Materials at the American Society for Testing Materials' 63rd Annual Meeting held at Atlantic City recently.

The 'Good and Bad Effects of Nuclear Radiation on Rubber' were described by John W. Born, of the B. F. Goodrich Company Research Centre. He pointed out that neutron and gamma radiations cause ionization in elastomers, resulting in cross-linking, chain scission, and molecular rearrangement. The net effect is that either cross-linking or chain scission predominates. Whether the result is good or bad depends on the state of the elastomer, its initial degree of cross-linking or polymerization, its inherent radiation stability, and its chemical and physical environment.

No Residues

The beneficial effects include polymerization, graft copolymerization, vulcanization, and post-vulcanization. Although in principle all four processes can be achieved equally well and more economically by chemical means, radiation induction has certain advantages. For example, no search is required for the proper chemical agents and conditions, no heating is necessary, and no chemical residues remain to cause undesirable later reactions when radiation is used. Also more nearly uniform vulcanization of thick rubber objects can readily be achieved. The author showed that assuming a rubber has an optimum degree of cross-linking or vulcanization, any radiation-induced change in such polymer structure is a bad effect. Detrimental radiation effects include over-vulcanization (cross-linking), degradation (chain scission), accelerated oxidation and ozonization, unsaturation, and molecular rearrangement. Two methods of inhibiting radiation damage are being studied and show promise: namely, physical addition of special inhibitors to rubber compounds and synthesis of elastomers containing inhibiting groups.

The second paper by L. B. Bangs, Research Division, The Goodyear Tire and Rubber Company, Akron, Ohio, discussed 'The Factor of Ozone Generation in Tests of Radiation Damage to Elastomers.' The rate at which ozone is generated by ionizing radiation is sensitive to environmental conditions during the exposure of oxygen to radiation. Temperature, pressure, dose rate, and nitrogen concentration all affect the production rate and the equilibrium concentration of ozone.

Silicone Insulation

At the conclusion of the D-11 meeting there was also presented a paper on 'Dynamic Testing of Rubber Products Using a Sinosoidal Strain Machine' by A. R. Payne of the Research Association of British Rubber Manufacturers.

New specifications for silicone rubber insulation for wire and cable are being completed by the Committee. Study is being undertaken of the problem of measuring insulation resistance of the newer polythene insulating compounds used on wire and cable. A review is being undertaken of all the ASTM specifications for insulated wire and cable with a view to standardizing and reducing the number of ageing and other requirements.

New definitions of the terms 'rubber,' 'rubber-like,' and 'rubber products' will be submitted to the Society for publication as in Tentative Definitions of Terms Relating to Rubber and Rubber-Like Materials (D1566–58T). Committee D-20 on Plastics is also studying these definitions.

Standard Hardness

Specifications for moisture resistance of rubber tape are in preparation. They will also cover butyl rubber with requirements for moisture as well as heat resistance.

Consideration is being given to a revision of the method of test for international standard hardness of vulcanized natural and synthetic rubbers (D1415-56T) for the use of a pellet-type specimen about half the size of that now specified. This revision has been proposed by the International Committee ISO/TC45. This modification of the method would produce a useful procedure for determining the hardness of thin pieces.

Revisions were completed of the methods for chemical analysis of natural rubber (D1278-58T) for procedures for copper, manganese, iron, ash, and the rubber hydrocarbon procedure. Study is being undertaken of a procedure for determining nitrogen in crude natural rubber for inclusion in Methods D1278. Plans were made to participate in the ISO/TC45 programme to test the physical properties of seven commercially made grades of natural rubber ranging from very slow to very fast cure rates. These tests will be made in about 25 laboratories throughout the world.

UV Stabilized Film

A type of transparent polythene film for long-lasting outdoor use is now being employed in a test installation in USA.

The new film is extruded from an Eastman specially stabilized Tenite polythene formulation that incorporates a non-pigment type of ultraviolet inhibitor. The inhibitor allows sunlight to penetrate the greenhouse and, at the same time, prolongs the life of the film, which is expected to withstand more than two years of outdoor exposure — at least twice as much as uninhibited film — with little loss of strength.

Doig Move

Lloyd Doig and Co. Ltd., manufacturers of infra-red heating equipment, have moved to large offices, and to a new and large factory at 64-66 London Road, Cheltenham, where the already existent laboratory and research facilities will be further expanded.

AMERICAN LETTER

Continued from page 279

in tyre sizes, even for new compact models, but the ratio of small to large tyres will be greater.

The replacement tyre category does not reflect these changes, as original tyres generally serve the new car owner for two or three years of driving.

Although tubeless tyres have been furnished on new cars since 1955, we still find that half of the replacement production is of the tube type. One official, Mr Earl Hathaway of Firestone, predicts that tubes will become extinct within a few years. However, as long as the older cars defy the concept of 'planned obsolescence,' they will continue to account for a substantial demand for tubes.

Plantation Share Survey

IN spite of the big fall in the price of spot rubber since midway through June the 'average' per lb. on the London market last month worked out at 31$\frac{7}{16}$d. This brought the January-July level to 35$\frac{1}{4}$d., and compared with 27$\frac{1}{4}$d. in the same period a year ago. From now on in the remaining months of this year, the comparison will be a 1959 period of 'squeeze' prices. Between the latter six months of last year the spot quotation was forced up from 31d. per lb. to over the 3s. mark. The final average for 1960 therefore will be much closer to the level of just over 30d. If prevailing values are approximately maintained it will come out at around 32d. per lb.

The latest International Rubber Study Group figures look good enough since they record underproduction of some 42,500 tons of natural rubber in the first five months of the year with world production estimated at 795,000 tons and the consumption at 837,500. But the picture clouds when comparison is made with last year when by the end of May consumption of 860,000 exceeded the supply handsomely. This year's decline in the use of the Eastern material without doubt stems from the exceptionally high price level ruling until recently. In the United States — the largest consumer of natural rubber still — 265,400 tons were used in the first six months of the year compared with 277,300 in January-June of 1959. In addition imports by the Russian bloc slumped from 118,500 to 33,500 no doubt at the expense of internal stocks. Reports, however, are frequent that buying from this quarter has now been resumed.

As far as the Stock Exchange itself is concerned there has been very little change in the pattern of trends, and in quiet trading there has been some buying of shares connected with companies whose 1959-60 results are due to arrive shortly. There are few who doubt that the operations of the Malayan producers which concluded their financial years on March 31, resulted in substantially increased profits. The dividend rates so far available show that distributions by directors are likely to be commensurately raised.

Those which have already beaten even the best optimistic forecasts include CHEMBONG MALAY RUBBER with more than doubled profits and a 2% increase in dividend to 35%. GOLDEN HOPE RUBBER is another to announce good results. In particular instance the payment to shareholders was doubled. Nevertheless, the most important event last season from the long term aspect has been the acquisition of control of NEW CROCODILE RIVER RUBBER. Following exchange offer last November 85.4% of the issued capital had been acquired by February. Meantime, further small purchases in the market have brought up the quota to a little over 86%. This holding is equal to nearly four thousand acres of rubber and just over one thousand acres of oil palms, and brings down the capital cost of the parent company to £38 per acre. On this basis the earning capacity amounts to almost 5% on the issued capital for every 1d. per lb. on the group rubber output. In addition substantial profits will no doubt accrue from palm oil, the interest in which is being steadily increased by new planting and conversion from old worn-out rubber acres. The group's rubber output improved to nearly 9m. lb., net sale proceeds averaging 28.9d. per lb. against 21.2d. and estate costs 18.0d. per lb. including over 5d. for export duty and replanting cess. A dividend of £44,260 net received from New Crocodile River is not credited in the revenue account being allocated to capital reserve. In future, however, income from this source will figure in the profit and loss account. As the phase of peak outlay on palm oil plant has apparently been passed, the directors are more liberal with the 1959/60 balance of £628,500. The dividend with net taxation costs £448,000 and £116,000 was spent on cultivation and replacements. The accounts disclose the working capital balance of £226,500 apart from trade investments, mainly in rubber shares standing at a written down book cost of £48,800 which is clearly a considerable under-valuation since 1959-60 dividends amounted to over £16,500.

Steps are being taken to increase the company's capital from £1m. of which £967,000 is in issue to £1$\frac{1}{2}$m. so that the board can be in a position 'to take advantage promptly' of any exceptional opportunity which may arise. It was rather unfortunate that no indication whether immediate acquisitions are in view were given.

LONDON SUMATRA PLANTATIONS, the new HARRISONS AND CROSFIELD company, has reported that acceptances to its offer to holders of UNITED SERDANG (SUMATRA) RUBBER have now reached the 90% mark. The company intends to exercise its right of compulsory acquisition of the outstanding balance. All the seven companies to which the original merger scheme applied will now become fully owned subsidiaries. It is expected that a similar outcome will ensue from the current offer to holders of UNITED LANKAT PLANTATIONS which expires at the end of the month.

How times have changed for stockholders of CAIRO (MALAYA) RUBBER. A few years ago they rejected a proposal emanating from one of their members for disposing of the estate. How right they were. For since then conditions in the industry have improved considerably and the subsequent increase in the dividend rate from 25% to 40% has fully justified their decision to 'stay put' in spite of replanting operations, the cost of which is now included in production expenditure output last year advanced from 720,000lb. to 763,000lb. Net proceeds averaged 24.4d. per lb., an improvement of 5$\frac{1}{2}$d. after deducting export duty and cess, while estate costs were just over 1d. higher at 15.0d. per lb. The result in profit is more than double at £27,100 from which the dividend of 40% with net taxation requires £20,200. The finances of the company received a useful fillip and net liquid assets now amount to £10,400, equivalent to a little under £8 per acre on the rubber area of 1,349 acres. Capital cost is extremely moderate at £35 per acre.

SANDAC RUBBER recently sold an outlying division of about 973 acres of rubber and now retains three estates of some 3,600 acres of which 1,569 are planted and situated close to Sandakan, the capital of BRITISH NORTH BORNEO. The bulk of the sale proceeds has been earmarked for extensions to the planted area and replanting, but obviously the location of the property opens up the possibility of further land sales. The improved conditions ruling last year provide shareholders with a double dividend and a special distributtion of 25% tax free is being made from the proceeds of the estate sale. The 1959/60 output amounted to 988,000lb. against 917,000lb. including 290,000 from the estate sold in March. The profit of £38,200 attracts net tax of £14,500 and the 30% dividend takes a further £15,000. The financial position in this case has been strengthened by the property transaction and net liquid assets now amount to £121,600 substantially exceeding the issued capital and representing a liquid reserve of as much as £77 per acre of rubber.

Goodyear Newcomer

A new design in a new tyre will be shown by Goodyear (GB) at the 1960 Commercial Motor Show — the Super Road Lug. It has an extra thick, specially compounded tread, and is available in the Goodyear 3-T construction.

Another tyre making its debut at the show—although it has been on sale for the past twelve months — is the Unisteel.

Anthony Latona, senior product engineer in the adhesives division of B. F. Goodrich Industrial Products Co., has been appointed manager of the division's latex and plastisol compounding and development laboratory.

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Rubber Statistics

INDONESIA — WESTERN GERMANY

INDONESIA'S rubber exports during the first quarter of 1960 totalled 143,019 tons, including 42,803 tons of estate rubber and 100,216 tons from smallholders. In the same period last year, exports totalled 143,355 tons, including 39,884 tons of estate rubber and 103,471 tons of smallholders' rubber. Domestic consumption was 3,750 tons during the first quarter of 1960 as against 4,500 tons in the same period of 1959.

The UK imported 39,366 tons of Indonesian rubber during the first quarter of 1960, as compared to 49,182 tons in the corresponding period of 1959.

Western Germany

Provisional figures are now available from the Federal Bureau of Statistics in Frankfurt for imports up to the end of May.

Imports of natural rubber and rubber sole crepe in the first five months of this year totalled 64,773.8 tons including 38,868 tons from Malaya, 5,589 tons from Nigeria, 5,494 tons from South Vietnam, 3,776 tons from Indonesia and 3,246 tons from Ceylon.

Imports of synthetic in the first five months of this year amounted to 19,000 tons. This included 13,059 tons from the United States, 2,721 tons from Canada and 1,508 tons from Italy.

West Germany's output of hard and soft rubber goods (other than tyres) during June totalled 23,521 tons against 24,804 tons in May and 142,480 tons in the first six months of this year compared with 110,967 tons (without the Saar Region) in the same period of 1959.

Tyre production in June fell to 18,371 tons from the 20,085 tons in May.

Output in the first six months of this year, at 114,057 tons, was appreciably above last year's production of 94,567 tons in the corresponding period.

The two figures given above, and thus any totals including them, are provisional.

The entire deck of this Ferguson tape recorder is vacuum formed and gold block printed by Clearex Products Ltd. from Iridon high-impact polystyrene sheet

Abstracts Index

Foster D. Snell, the US consultants, have published a 654-page, five year index to their Chemical Market Abstracts. A single reference in the index is claimed to locate virtually every reference made to a particular company in trade literature over five years. 14,000 companies are listed.

A new £55,000 omnibus garage at Stoke, opened on August 9, used 4,600 sq. yd. of 250 gauge Fablon polythene film in its construction.

Crop Returns

Unless otherwise indicated the figures quoted, to the nearest thousand lb., represent crop returns for the month stated and for the number of months of the planting company's financial year to date. Corresponding figures are given in parentheses.

June

HARRISONS AND CROSFIELD

Allied Sumatra.—696 (725). 6 mths—4,222 (4,173).
Asahan.—88 (110). 11 mths—1,032 (1,272).
Bah Lias.—132 (137). 8 mths—1,190 (1,171).
Central Sumatra.—63 (67). 12 mths—832 (1,012).
Lankat Rubber.—67 (60). 3 mths—192 (160).
Mendaris.—152 (176). 6 mths—928 (994).
Namoe Tongan.—196 (265). 10 mths—2,318 (2,321).
Sialang.—205 (195). 5 mths—944 (906).
Soengei Rampah.—44 (55). 6 mths—262 (285).
Tanah Datar.—65 (72). 6 mths—368 (387).
Tandjong.—146 (137). 12 mths—1,804 (1,747).
Toerangie.—170 (181). 8 mths—1,508 (1,499).
United Lankat.—28 (26). 6 mths—179 (158).
United Serdang.—825 (752). 10 mths—8,609 (8,477).
London Asiatic.—1,532 (1,441). 6 mths—9,063 (8,472).
Oriental.—292 (250). 6 mths—1,544 (1,396).
Bukit Kajang.—105 (—). 6 mths—637 (—).
Lanadron.—449 (440). 6 mths—2,433 (2,359).
Pataling.—1,309 (1,273). 8 mths—10,311 (9,296).
Jugra Land and Carey.—430 (472). 8 mths—3,484 (3,711).
Golden Hope.—709 (750). 4 mths—2,634 (2,721).
New Crocodile.—245 (239). 4 mths—848 (875).
Castlefield.—276 (299). 12 mths—3,166 (2,933).
Holyrood.—83 (72). 6 mths—488 (406).
Hongkong.—33 (28). 6 mths—179 (159).
Hoscote.—257 (242). 12 mths—2,890 (2,883).
Killinghall.—47 (46). 12 mths—517 (522).
Kuala Selangor.—72 (74). 6 mths—387 (361).
Kulai.—185 (199). 8 mths—1,406 (1,606).
Malaysia.—57 (57). 6 mths—337 (306).
Prang Besar.—336 (262). 3 mths—933 (735).
Sandac.—61 (68). 3 mths—193 (209).
Seaport.—74 (72). 12 mths—864 (908).
Malayaam.—609 (342). 3 mths—2,118 (1,782).
Lunuva.—101 (85). 6 mths—570 (577).
Bajoe Kidoel.—240 (206). 3 mths—724 (619).
Djasinga.—105 (116). 12 mths—1,256 (1,438).

RUBBER ESTATE AGENCY

Kuala Lumpur—684 (633). 9 mths—5,770 (5,752).
Jeram.—335 (343). 9 mths—2,768 (2,641).
Tamiang (Malaya).—61 (69). 9 mths—606 (652).
Sungei Kahang.—160 (165). 9 mths—1,376 (1,290).
Bandar Sumatra.—72 (84). 11 mths—942 (1,069).
Batu Kawan.—56 (65). 10 mths—601 (613).
Buntar.—115 (110). 6 mths—637 (598).
Kepitigalla.—66 (52). 3 mths—154 (128).
Langkat Sumatra.—79 (73). 6 mths—452 (426).
Sungei Bahru.—121 (113). 12 mths—1,520 (1,261).
Tambira.—85 (107). 12 mths—1,292 (1,262).
Tanjong Malim.—369 (368). 12 mths—4,161 (4,256).
Amalgamated Rubber.—43 (35). 6 mths—250 (202).
Java Rubber.—90 (86). 6 mths—556 (536).
Soember Ajoe.—21 (20). 9 mths—156 (244).

THOMAS BARLOW

Bradwall (FMS).—168. 6 mths—830 (718).
Chersonese (FMS).—65. 6 mths—381 (329).
Highlands and Lowlands.—2,005. 6 mths—11,081 (10,718).
Krian.—6. 6 mths—32 (48).
Sungei Krian.—160. 6 mths—943 (867).
Muar River.—204. 3 mths—1,160 (1,170).

Inch Kenneth Kajang.—233 (211). 6 mths—1,210 (1,170).
Mengkibol (CJ).—95 (90). 6 mths—565 (493).
Malaya General.—185 (215). 10 mths—1,852 (2,103).
Sedenak.—181 (176). 8 mths—1,465 (1,513).
Anglo Johore.—38 (35). 11 mths—384 (372).
Bekoh CRE.—192 (202). 3 mths—544 (554).
KPRP.—64 (55). 3 mths—169 (172).
Rim (Malacca).—243 (194). 12 mths—2,699 (2,558).
Kurunegala.—31 (24). 6 mths—151 (133).
Sittang Valley.—22 (36). 12 mths—1,030 (1,248).

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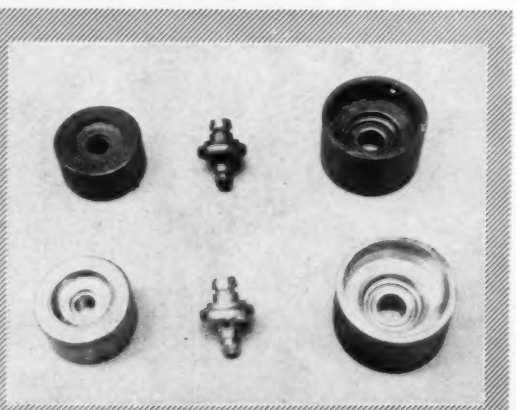

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PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Tyres

No. 837,849. National Research Development Corporation. Inventor: D. Tabor. Application, June 18 1957. Filed, September 8 1958. Published, June 15 1960.

The tread of a tyre is made of a rubber composition having a rebound resilience not greater than 40% at any temperature within the range of −10° to +50°C. The rebound resilience is measured by means of a falling ball or pendulum such as the Lupke pendulum. Butyl rubber is the preferred material for the tread while other suitable materials are nitrile rubber and organic polysulphide rubbers.

The advantage of the use of a rubber of low rebound resilience for the tread is that the tyre has a greater resistance to skidding than a conventional tyre, the rebound resilience of the tread of which rises to at least 60% at some point within the above temperature range. According to the invention, parts of the tyre other than the tread may be made of rubber of low rebound resilience, although it is preferred to make the side walls of rubber having a relatively high rebound resilience and to confine the use of the rubber of low rebound resilience to the tread.

Production of Crumb Rubber

No. 840,718. Columbian Carbon Co. Application and Filed, June 27 1957. Application in USA, September 19 1956. Published, July 6 1960.

Latex of natural or synthetic rubber is coagulated by atomizing the latex into a body of liquid acid coagulant of substantial depth. The lacy agglomerates of coagulated rubber thus formed are floated upwardly through the coagulant and transferred to a second chamber which is provided with mechanical agitators to break up the agglomerates into rubber crumbs ¼ to ¾in. in diameter. The crumbs are separated from the liquid and then washed and dried. When applied to the coagulation of SBR latex, the customary preliminary salt creaming step is eliminated by using the present coagulation process.

The three examples given relate to the coagulation of SBR latices. In one example, the SBR prepared by the present coagulation process was compared in a tyre road test with SBR produced by the conventional coagulation process involving salt creaming. The rubber produced by the present process showed a road wear rating of 120% compared with a road wear rating of 100% for the rubber produced by the conventional process.

Bonding Polyamides to Rubber

No. 843,377. Badische Anilin-und Soda-Fabrik AG. Application and Filed, June 4 1958. Application in Germany, June 8 and July 11 1957. Published, August 4 1960.

Fabrics and films of polyamides are bonded to natural or synthetic rubber by means of a mixture comprising 40 to 80% of an aqueous solution of a resorcinol-formaldehyde condensation product and 60 to 20% of an aqueous dispersion of a copolymer of butadiene, styrene and a N-vinylimidazole or a N-vinylcarbazole. The monomers in the copolymer may be used in various proportions, but the copolymer preferred consists of 60% of butadiene, 35% of styrene and 5% of N-vinylimidazole. The polyamide fabric or film is immersed in the aqueous adhesive mixture, removed and allowed to dry, and then applied to the rubber, the two layers being heated at about 150°C. under a pressure of about 20kg./cm.² to vulcanize the rubber and effect bonding.

Synthetic Rubber Compositions

No. 843,588. Switzer Brothers Inc. Application and Filed, November 26 1958. Application in USA, December 23 1957. Published, August 4 1960.

Hexamethylene tetramine is claimed as the sole curing agent for chlorosulphonated polythene. The curing agent is particularly useful for coating compositions of chlorosulphonated polythene containing daylight fluorescent pigments for use, for example, on life raft canopies. Satisfactory curing of the compositions has been achieved by overnight air-drying or by heating at 110°C. for about 20 minutes or at 150° for about five minutes. Such conditions of curing do not diminish the brightness of the fluorescent pigments, as occurs with the heating necessary with conventional curing agents, while an additional advantage of the use of hexamethylene tetramine is that the cured coatings have very high resistance to abrasion.

Shorter Abstracts

Pigmented Polythene. 834,160. General Aniline and Film Corporation. Filed, March 7 1958.—Pigments are more evenly distributed throughout polythene by incorporating a small amount of N-vinyl-α-pyrrolidone polymer in the polythene together with the pigment.

Bonding Polyurethane to Rubber. 834,223. Dunlop Rubber Co. Ltd. Filed, May 29 1956. — Polyurethane elastomer is bonded to natural or synthetic rubber by means of an organic tri-isocyanate containing as a modifier a polyester, a polyester amide or a polyether having terminal hydroxy or amino groups, or an uncured polyurethane reaction product.

Copolymers. 835,466. E. I. du Pont de Nemours and Co. Filed, June 21 1957. — Copolymers of ethylene and vinyl acetate are prepared by carrying out conjoint polymerization of the monomers in the presence of a co-ordination catalyst.

Ethylene Polymerization Catalyst. 834,381. Du Pont of Canada Ltd. Filed, April 18 1958.—A catalyst for low-pressure polymerization of ethylene is made by irradiating with actinic light a solution of titanium tetrachloride in a saturated hydrocarbon solvent, in the presence of a chlorine scavenger. No aluminium trialkyl is used in conjunction with the catalyst.

Latex Preservation. 836,250. The Goodyear Tire and Rubber Co. Filed, July 30 1957.—Concentrated natural rubber latex is preserved by a quantity of ammonia, insufficient alone to preserve the latex, in conjunction with a 2-thio-thiazyl compound and/or a thio-carbamyl-thio compound, these compounds conforming to a specified structural formula.

Polymerization of Olefins. 837,055. Petrochemicals Ltd. Filed, April 18 1958.—In a Ziegler-type catalyst, there is used for the aluminium compound component an aluminium compound which contains an amino group attached through its nitrogen atom to an aluminium atom, the amino group containing at least one nitrogen-hydrogen bond.

This glass fibre dinghy —'Honeycraft'—can be easily transported on the roof of a small family car and launched by children. Made by Palmers Reinforced Plastics, it costs only £30 and can be powered by a small outboard motor

Rubber Markets

LONDON

In the absence of buying support, the declining trend continued, following liquidation in the East and the lower level of values at Singapore. Minor upturns were short lived. Occasional steadier interest was noted for the lower grades of sheets at only small discounts for No. 1 RSS International, but for the most part physical rubber was slow to recover.

Latest prices are as follows:

No. 1 RSS Spot: 28⅝d.-28⅞d.

Settlement House:

September 28⅞d.-29⅛d.
October/December 28⅞d.-29⅛d.
January/March 28⅝d.-28⅞d.
April/June 28⅝d.-28⅝d.
July/September 28⅛d.-28⅜d.

No. 1 RSS cif basis ports:

September 28⅜d.-29d.
October 28⅜d.-29d.

Godown:

September 98 Straits cents nominal.

LATEX

Centrifuged 60% latex per gallon in drums, seller, September, October, 16s. 10d., cif European ports. Spot, seller, 17s. 6d. Bulk, normal, d.w. 16s. 8d. August. Creamed, seller, nominal, 16s. 6d. September, October. Normal, seller, September, 14s. 4d.

BANGKOK

No. 1 RSS

The price of No. 1 RSS at Bangkok on August 15 was 33.62½ US cents per lb.

SINGAPORE

Trading was slow at the opening on August 15 and the market eventually eased on upcountry godown liquidation. Interest in lower sheets was limited but sellers were not pressing. In the afternoon, sellers continued to unload and prices eased. However, there was a slight recovery near the close.

	Malayan cents per lb., fob Malayan ports to open ports	
	Aug. 15	Prev. Close
No. 1 RSS, Sept.	101⅛–101⅜	103⅛–103½
Oct.	101⅛–101⅜	103⅛–103⅜
No. 2 RSS, Sept.	100⅞–100⅞	102⅛–103⅛
No. 3 RSS, Sept.	99⅞–100⅛	101⅛–102⅛
No. 4 RSS, Sept.	99⅛–100	101 –102
No. 5 RSS, Sept.	96⅛–97⅛	97⅛– 98⅛
No. 1 Spot ..	100⅝–101⅛	102⅛–102⅝
No. 3 blanket thick remilled crepe, Sept. ..	93 – 94⅛	94⅛– 95⅛
No. 1 fine pale crepe, Sept. ..	110 –112⅛	111⅛–113⅛
2x thin brown crepe, Sept. ..	91⅛– 92	92⅛– 93⅛

Tone: Steady.

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums, fob at 190.40d. per gallon.

CEYLON

No. 1 RSS

The price of No. 1 RSS at Colombo on August 15 was 110¼ (113⅜) Ceylon cents per lb.

NEW YORK

The New York rubber market ruled as under on August 15:

DEALERS' PRICES

	US cents per lb., ex-dock	
	Today	Previous
No. 1 RSS, Aug.	36⅛b-36⅜a	36⅜b–37a
Sept.	36⅛b–36⅜s	36⅛b–36⅛a
No. 2 RSS, Aug.	36⅛b–36⅛a	36⅛b–36⅜a
Sept.	36b –36⅛a	36⅛b–36⅜a
No. 3 RSS, Aug.	36⅛b–36⅛a	36⅛b–36⅜a
Sept.	35⅞b–36⅛a	36b –36⅛a
No. 1 RSS, Spot	37n	37⅛a
No. 3 amber blanket crepe, Oct.	31⅛n	31⅛n
No. 1 latex thin crepe, August/September ..	37⅛n	37⅛n
No. 1 latex thick crepe, August/September ..	Unquoted	37⅛n

FUTURES—REX CONTRACT

	Closing	Prev. Close
Sept. ..	36.65t	36.85t
Nov. ..	35.20t	35.50b–35.60a
Jan. ..	34.65–34.70t	35.00b–35.20a
March ..	34.25b–34.40a	34.76b–34.90a
May ..	34.00b–34.30a	34.40b–34.55a
July ..	33.75b–34.05a	34.10b–34.35a
Sept. ..	33.50b–33.80a	33.85b–34.20a

Sales: 29. Tone: Steady.

Rubber futures after early easiness following the declines abroad on August 15 steadied on light covering. Dealings were meagre. Physical rubber was quiet.

AMSTERDAM

The Amsterdam rubber market ruled as under on August 15:

	Guilders per kilo	
No. 1 RMA	Aug. 15	Previous
August	2.90	2.93
September	2.90	2.93
October	2.89	2.93
November	2.88	2.92
December	2.87	2.91
October/December ..	2.88	2.92

Sales: 15. Tendency: Easier.

DJAKARTA

The market was quiet most of August 15. Towards the close, some 30 tons of sheet No. 1 were sold at between 36 and 35.25 rupiahs per kilo.

	Rupiahs per kilo	
	Aug. 15	Previous
Spot No. 1 priok ..	35.25b	35.50b
Spot No. 2 priok ..	34.25b	34.50b
Spot No. 3 priok ..	31.75b	32.00b
No. 1 fine pale crepe, spot	35.50b	35.50b

Tone: Quiet.

SPACE TYRE

A fabric-reinforced-tread aeroplane tyre made by B. F. Goodrich, gets its name and its high speed capacity from the fact that its tread is laminated with multiple plies of nylon cord. Thousands of cords, each with a tensile strength of 30lb., bind the tread to the tyre carcass to keep centrifugal force from stripping the tread at high speed.

The nylon laminates are also said to resist tread cutting and punctures, and prevent the formation of dangerous high-speed shock waves that affect fast rolling tyres.

The tyre will be used on America's first manned space vehicle, North American Aviation's rocket-powered X-15, now being tested. Two fabric reinforced treads will absorb much of the shock of landing the X-15 after its probe more than 100 miles above the earth at speeds exceeding 3,600 miles an hour.

Air Circuit Breaker

A new air circuit breaker, which relies solely on British Resin Product's Rockite DMC mouldings for its main insulation, is now being manufactured by J. G. Statter and Co. Ltd., Amersham, Bucks.

The use of DMC for these mouldings, which are seven in number, is said to have resulted in considerable savings in production time. It has also facilitated new design to be incorporated thus reducing the number of loose parts to a minimum.

Three identical mouldings constitute the bases for the circuit breaker enabling each of three phases to be manufactured as a single pole assembly. By making the operating links in Rockite DMC a much greater clearance than is normally possible has been readily obtained between the live parts and earth.

Majority Acceptance

London Sumatra Plantations announces that acceptances of its offer to acquire all the issued capital of the United Lankat Plantations Company have been received from the holders of 90% of the issued capital.

Mr A. Signorini has been appointed general manager of Pirelli - General Cable Works in place of Mr J. R. Harding who has left to take up another position.

Mr Paul D. Scott and Mr John L. Smart have been appointed vice-presidents of Dow Chemical of Canada.

Industry INTELLIGENCE

Technical Data

Butyl Bridge Bearings

Polysar Technical Report No. 9:6A issued by Polymer (UK) Ltd., Walbrook House, Walbrook, London, E.C.4, details a recent addition to the numerous uses of Polysar butyl rubber. This is for the manufacture of elastomeric bridge bearing pads (in place of steel sliding plates, rollers and rocking arms) which are becoming increasingly popular with design engineers. Rubber pads have the advantage of being simple, effective, maintenance free and economical. They also take very little space, distribute the load evenly and compensate for mechanical and thermal stress in all directions.

Polysar Butyl 400 has good resistance to weather ozone, heat and cold over long periods of time, has excellent dampening properties which minimize vibration and is therefore a suitable material for this application. The report describes a compound, giving details of mixing, curing and properties, and also shows design data for pads made from the compound which are in actual service in a 56ft. reinforced concrete bridge recently completed by Polymer Corporation at Sarnia.

Conductive Vinyl Compound

Abbey 100 is a conductive vinyl compound recently introduced by the Abbey Plastics Corporation, Hudson, Massachusetts, whose agents in the UK are Croxton and Garry Ltd., High Street, Kingston-on-Thames.

The material has a controllable resistivity down to 7 ohms./cm.^{3}, and is also available in a rigid form which has a resistivity as low as 1ohm./cm.^{3}. It can be calendered and extruded without altering the quality of either the physical characteristics or the electrical properties. Suggested uses of the material include conductive gaskets, tubes and impregnated paper, de-icing on aircraft, hospital operating theatre equipment, microphone equipment and safety equipment of many types.

Urethane Foam Insulation

Technical Information sheet Urethane PC/U.20, recently issued by the Dyestuffs Division of I.C.I. Ltd., describes tests carried out to establish the resistance of rigid foams based on Daltolac 24 and Suprasec D to high temperatures. A welded joint was produced between two steel plates $\frac{3}{4}$in. thick backed with a 12in. thickness of foam. The condition of the foam after formation of the weld showed that it should be possible to weld together steel plates backed with 6in. or more of foam of this type, without affecting goods stored in close proximity to the area, and without reducing the insulating efficiency of the foam.

Machines, Materials and Equipment

New Baker Perkins Mill

A new single roller mill, suitable for grinding clays, natural earths, carbons and coke is to be made and marketed by Baker Perkins Ltd. of Peterborough.

To be known as the Baker-Meyer Mill, the unit was developed by Neuman and Esser, of Aachen, and will be available in five sizes.

One of the novel characteristics of the machine is the use of a hydraulic ram to apply pressure between the roller and the bull ring. This is done in such a way that roller bounce is eliminated, adjustment between the roller and the ring for different types of material can easily be made and automatic compensation is achieved when wear takes place.

With the Baker-Meyer Mill hot gases at temperatures of up to 550°C. can be used for drying during grinding. Crude materials containing as much as 25% moisture can be ground without difficulty.

Designed for easy and minimum maintenance, tests on the mill have shown that on the arduous duties to which these machines are subject, the service life of the components subject to wear is considerably increased in comparison with other ring roller mills.

Thermi-Tem

Testing Machines Inc. of Mineola, New York, have introduced a new instrument called the Thermi-Tem which is for quick and accurate measurement

of the temperature of liquids, penetrable masses and surfaces.

It records the temperature in from 3 to 10 seconds with an accuracy of 2%. Temperature scales are linear and available down to −50°F. and up to 500°F. The indicating meter has a shock protected mounting in an anodized aluminium case. The probe is on a 6ft. lead and can be either straight or have a 90° angle.

Offset Callipers

A new Swiss development of the sliding calliper gauge extends its application to the measurement of distances between offset faces. In one form of the new instrument, the shaft is cylindrical, and the moving arm can be rotated about it through 360°. In the alternative form, a conventional flat shaft is used, but the moving arm is provided with an axis of rotation.

Publications

Tiles and Under-Floor Heating

Thermoplastic Tiles on Floor Heating Systems is the subject of a booklet by F. L. Brady, M.Sc., A.R.I.C. Mr Brady — formerly of the Building Research Station and now Technical Director of the Marley Group—deals with thermal resistance and the value of a flooring having little resistance to heat flow; thermal expansion; dimension changes resulting from moisture and temperature changes; indentation, and the conditions that reach what Mr Brady calls 'grumble-point'; and the effects of coverings—such as carpets—over heated floors. The booklet is obtainable free from The Marley Tile Co. Ltd., Sevenoaks, Kent.

Paint Weathering

The text of a paper presented before the Bond Voor Materialenkennis in Utrecht, entitled 'Performance during Natural Weathering of some White and Coloured Emulsion Paint Systems,' has been issued in booklet form by British Titan Products Ltd. This compares the durability of a range of paints exposed to natural weathering in North-East England. The American type of oil-bound house paint was also tested. The phenomena of chemical fading and fading by chalking are also discussed, and results of tests are described which suggest that fading by chalking is indeed true fading of the coloured pigment by destructive oxidation.

I.C.I. Plastics Today

This booklet is published quarterly by I.C.I. Ltd., Plastics Division, for the interest of all users and potential users of plastics materials and articles made from them. It is intended to keep its readers abreast of technological developments and uses of the materials made by I.C.I. The latest issue No. 5, includes articles on the use of Darvic at Kariba, Alkathene in radioactive effluent drains, Butakon S7001 and Perspex. Also a description of the manufacture of PVC at Hillhouse is given, and a feature on the market for larger mouldings such as a moulded polythene boat which is being made in Norway.

COMPANIES in the NEWS

Lacrinoid Products

As reported, F. Francis and Sons (Holdings) has made a share exchange offer for the £176,000 capital of Lacrinoid Products (*RJIP* August 13). The offer is of two Francis 5s. shares for every nine Lacrinoid 2s. units, with an alternative offer of 4s. 4½d. cash per Lacrinoid share.

The bid is open until September 12 or not later than September 30.

Francis has also arranged to purchase a small private company for £67,000 cash to add to its manufacture of closures, and proposes to raise about £1m. partly to finance the acquisitions, to meet expenditure in expanding the business and to augment working capital.

F. Francis numbers among its products tin boxes and steel drums, and the offer has been made to increase the diversification of the company's packaging side.

Harpenden (Selangor) Rubber

Harpenden (Selangor) Rubber Co.'s sales for the nine months ended December 31, amounted to 903,000lb. at an average price of 24.71d. a lb. This is against their estimate for the 12 months of 1,100,000lb. As a result of an unusually dry spell during the past months, the originally estimated crop for 1960 of 1,350,000lb. will not be attained, says Mr Greene, chairman.

Major Dollar Earner

Asbestos exports this year will bring to Canada almost $100m. more than half of which is from the USA, the Quebec Asbestos Mining Association estimates. Quebec's asbestos mines have become one of Canada's major export-dollar earners.

In addition to maintaining its high position in construction industry markets, the Canadian mineral is also finding new uses in nuclear weapons and other modern scientific instruments.

Welding Torch

It has been pointed out that in 'Plastics At Work' (*RJIP* July 2, 6) a reference to the new type of high-speed welding torch gives the impression that it can be used only with compressed air. In fact it can be used with nitrogen or compressed air according to the material to be welded.

Wandleside Warren Wire Company of Dunmurry, Northern Ireland, announces that its supplies of PTFE glass fabrics will, in future, be marketed through the textile division of Henry Simon Ltd., Cheadle Heath, Stockport, Lancashire.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

ANCON (800,246) Belts and belting, all for machinery. Andre Rubber Co. Ltd., Kingston By-pass, Surbiton, Surrey. (Class 7; May 17 1960).

CERCOTE (798,667) Compositions (not being paints) principally of synthetic resins and being for use in coating build-surfaces. Artrite Resins Ltd., Kingsway Chambers, 44-46 Kingsway, London, W.C.2. (Class 1; May 24 1960).

INTERVULC (798,307) Machines and machine tools, all used in vulcanising and similar repairing processes for rubber articles and for rubberised articles. Stahl-Gruber Otto Gruber and Co., Rosenheimerstrasse 17, Munich 8. Address for service is c/o Reddie and Grose, 6 Bream's Buildings, London, E.C.4. (Class 7; May 24 1960).

HILEX (796,551) Plastics in the form of sheets, bands, strips, films, plates, slabs, blocks, bars, rods, tubes or cylinders and included in Class 17. British Celanese Ltd., Celanese House, 22 and 23 Hanover Square, London, W.1. (Class 17; May 24 1960).

(796,702) Tubes made of plastics; and mouldings and extrusions made of plastics; all inculded in Class 17. P. H. Muntz and Barwell Ltd., Alexandra Works, West Bromwich, Staffordshire. (Class 17; May 24 1960).

HANK BUSH BABY (800,644) Bushes and sleeves, all made of plastics and none being parts of machines. Hall and Kay Ltd., Birch Mills, Britannia Street, Ashton-under-Lyne. (Class 20; May 24 1960).

HI-FI (787,462) Printers' blankets (not of textile material). The Goodyear Tire and Rubber Co., 1144 East Market Street, Akron. Address for service is c/o Marks and Clerk, 57 and 58 Lincolns Inn Fields, London, W.C.2. (Class 14; June 14 1960).

EUROMAC (798,682) Wrapping and packaging materials made of paper, cardboard, laminations of polythene film or of regenerated cellulose films. Hamac A.G., Bahnhofstrasse 5, Zug, Switzerland. Address for service is c/o A. A. Thornton and Co., Northumberland House, 303-306 High Holborn, London, W.C.1. (Class 16; June 14 1960).

INTERMAC (798,683) Wrapping and packaging materials made of paper, cardboard, laminations of polythene film or of regenerated cellulose film. Hamac A.G., Bahnhofstrasse 5, Zug, Switzerland. Address for service is c/o A. A. Thornton and Co., Northumberland House, 303-306 High Holborn, London, W.C.1. (Class 16; June 14 1960).

BEWAL (793,928) Material included in Class 17 in sheet form made of laminations of plastics. Harald Wallander, Sven Harald Wallander and Bengt Adolf Wallander, trading as Bröderna H. Wallander, Nordmaling, Sweden. Address for service is c/o Churchill and Sim Ltd., 29-31 Clements Lane, London, E.C.4.

LUXAFOAM (801,564) Articles included in Class 17 made wholly or principally of foamed materials. Luxan Ltd., 4 Chepstow Street, Manchester, 1. (Class 17; June 14 1960).

CERADEK (790,968) Non-metallic preparations in paste form containing epoxy resins and being for use as flooring and road-surfacing materials. England Hughes, Bell and Co. Ltd., Valley Works, Monton Road, Eccles. (Class 19; June 14 1960).

VINABOND (795,976) Synthetic resin compounds for use as adhesives for industrial purposes. Vinatex Ltd., Devonshire Road, Carshalton, Surrey. (Class 1; June 21, 1960).

MASTERFAX (796,333). Plastics included in Class 17 in sheet form for bonding to paper or to plastics for use as a surface decorative or protecting agent. Ditto Inc., 6800 McCormick Road, Chicago 45, Illinois, USA. Address for service is c/o A. A. Thornton and Co., Northumberland House, 303-306 High Holborn, London, W.C.1. (Class 17; June 21 1960).

NEW COMPANIES

Plastic Importers (Norwich) Ltd. (664,347).—July 6. Capital: £1,000 in £1 shares. Solicitors: Mills and Reeve, Norwich.

Wilton Plastics Ltd. (664,119).—July 4. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in fancy goods of all kinds, plastic rubber, leather and other goods, etc. The directors are: David L. Hyman, 3 Litchfield Court, Litchfield Way, N.W.11; Louis Mintz, 37 Wilton Court, Wilton Road, N.W.; Gerald Koss, 23 Cunningham Court, N.W.8. Regd. office: 31 Winchester Road, N.W.3.

P. G. Plastics Ltd. (664,206).—July 5. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in plastic materials, etc. The directors are: Percy J. George, 56 Hamilton Avenue, Tolworth; Mrs. Mary A. George, 56 Hamilton Avenue, Tolworth; Victor R. Piercy, 21c St. Philips Road, Surbiton, and Rose V. Piercy. Regd. office: 121 Ewell Road, Surbiton.

Allplas Ltd. (664,684). July 11. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in plastic materials, leather and artificial leather and plastics, etc. Regd. office: 52/4 Grays Inn Road, W.C.1.

Bloom and Ashdjian Ltd. (664,819).—July 12. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in footwear, leather and rubber goods, etc. The directors are: Gaydar Ashdjian, 66 Ashbrook Road, N.19; Abraham S. Bloom, 48 Green Walk, N.W.4. Regd office: 66 Ashbrook Road, N.19.

Hamac Hansella Machinery Ltd. (664,833).—July 12. Capital: £30,000 in £1 shares. To carry on the business of importers and manufacturers of and dealers in plant, machinery, equipment and other engineering products; wrapping and packaging in plastic, wood and other material domestic or pharmaceutical goods, soaps, detergents, alcoholic liquors, vehicles, machinery, etc. The first directors are to be appointed by the subscribers. Solicitors: Simmons and Simmons, 1 Threadneedle Street, E.C.2.

Hamac Hansella Sapal Ltd. (664,834).—July 12: Capital: £5,000 in £1 shares. Other details are similar to Hamac Hansella Machinery Ltd. (q.v.).

Bonding a sealing strip in the weather channel round the engine well of an Austin 7 with neoprene adhesive. Neoprene solvent adhesives are used for the majority of bonding jobs on Austin's assembly lines at their Longbridge, Birmingham works

John Woolley and Son Ltd. (665,344).—July 18. Capital: £15,000 in £1 shares. To carry on the business of manufacturers of and wholesale dealers in tyres, etc. The directors are: John Woolley and Maud Woolley, both of 180 Newmarket Road, Cambridge. Regd. office: 180 Newmarket Road, Cambridge.

Ranwal Ltd. (665,376).—July 18. Capital £2,000 in £1 shares. To carry on the business of manufacturers of and dealers in natural and synthetic rubber vulcanite, plastics, etc. The directors are: Group Captain James Rankin, D.S.O., D.F.S., 36 High Street, Harpenden, Herts.; Keith Platts, 2 The Close, Harpenden, Herts. Regd. office: 69 Reginald Street, Luton, Beds.

Rubber Engineering Investments Ltd. (663,230).—June 24. Capital: £100 in £1 shares. The directors are: William S. Baker, 47 The Drive, Northwood, Mdx.; Douglas P. Bidmead, 'Oakdene,' Turner Road, Slough, Bucks. Secretary: D. P. Bidmead. Regd. office: 109 Uxbridge Road, W.5.

Pickplast Ltd. (663,079.—June 23. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in plastic, etc. The first directors are to be appointed by the subscribers. Secretary: Thomas A. Herbert, 156 Strand, W.C.2.

Rowland Barker & Son Ltd. (663,099).—June 23. Capital: £100 in £1 shares. To carry on the business of manufacturers and manipulators of all types of metal (both ferrous and non-ferrous) plastics and wood, electricians, general and motor engineers, etc. The directors are: Rowland Barker, Mrs. Winifred L. Barker, John R. D. Barker and Miss Angela C. Barker, all of 45 Chelsea Road, Sheffield. Regd. office: 45 Chelsea Road, Sheffield, 11.

Dorman, Sharples (Plastics) Ltd. (665,398).—July 19. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in plastics, etc. The directors are: Arthur Dorman, 271 Smith House Lane, Lightcliffe, Halifax; Leonard Sharples, 44 Dewsbury Road, Rastrick, Brighouse. Regd. office: Cliffe Works, Cliffe Road, Brighouse.

G. R. Deighton (St. Helens) Ltd. (665,635).—July 21. Capital: £100 in £1 shares. To carry on the business of manufacturers and moulders of glass fibre/polyester laminates, plastic materials. The directors are: George R. Deighton and Mrs. Linda Deighton, both of 27 Folds Lane, St. Helens. Regd. office: 27 Folds Lane, St. Helens.

Weathersports Ltd. (666,181).—July 27. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in coats, costumes, mackintoshes. The directors are: George Singer, 7 Seymour Court, N.W.2; Kurt Spitzer, 42 Stoneygrove, Edgware, Middlesex. Regd. office: 3 Oxford Street, W.1.

Plasto-Leathercraft Ltd. (665,569).—July 20. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in goods made of plastics, polythene, metal, wood, glass, china, leather. The directors are: Aleksander Olenski, 16 Auburn Road, Old Trafford, Manchester, 16; Thomas E. Haynes, 78 Endsor Street, Moss Side, Manchester. Regd. office: 25 Milton Street, Hulme, Manchester, 15.

Hedges Reinforced Plastics Ltd. (665,538).—July 20. Capital: £15,000 in £1 shares (10,000 ordinary and 5,000 preference). To acquire the business of the manufacture of fibre glass and plastic products carried on by C. Hedges at 25 Kinloch Drive, N.W.9, as 'Hedges and Co,' etc. The directors are: Cyril Hedges, 25 Kinloch Drive, N.W.9; Laurence H. Hedges, 81 Warren Way, Digswell, Welwyn.

Soplaril (Great Britain) Ltd. (665,967).—July 25. Capital: £10,000 in £1 shares. To carry on the business of manufacturers of and dealers in plastics. The directors are: Adrian F. Jucker, The Brewhouse, Cookham, Berks.; Edmond J. N. Cooper, Stoke Green Farmhouse, Stoke Green, near Slough; Albert T. Buckeridge. Regd. office: 4 Watkin Road, Exhibition Grounds, Wembley, Middx.

M.M. Plastics (Sales) Ltd. (665,953).—July 25. Capital: £5,000 in 5s. shares. The directors are: Michael X. Tranfield and Colin Tranfield, both of 51 Bents Drive, Sheffield, 11. Regd. office: 32 Southbourne Road, Sheffield.

Plastic Fencing Ltd. (665,679).—July 21. Capital: £100 in £1 shares. The directors are: John W. Allison, 4 Hazelcroft, Cedar Drive, Hatch End, Middx.; Frederick T. Allison, 28 West Towers, Pinner, Middx. Regd. office: 13 Grafton Road, Worthing, Sussex.

F. J. Stokes Ltd. (666,137).—July 27. Capital: £10,000 in £1 shares. To carry on the business of manufacturers of and dealers in pharmaceutical plastic moulding, vacuum and industrial and laboratory apparatus. Solicitors: Lovell White and King, 1 Serjeants Inn, E.C.4.

Palmers Tyre Service (Stoke) Ltd. (665,565).—July 20. Capital: £5,000 in £1 shares. The directors are: John S. Palmer, 11 Carr Manor Parade, Leeds; John M. Palmer, Dinahs Cottage, Long Causeway, Leeds, 16; Samuel S. Palmer, Hill Top, Palmers Green, Hartshill, Stoke-on-Trent. Regd. office: 25 Sheepscar Street South, Leeds.

Charles Dumayne Ltd. (666,203).—July 20. Capital: £1,000 in £1 shares. To carry on the business of manufacturers and moulders of and dealers in all kinds of plastics, etc. The directors are: Benjamin J. Charles, 140 Wilmer Road, Heaton, Bradford, 9; Hubert J. Dumayne, 91 Walters Road, Llanelly.

Elpitiya Rubber Holdings Ltd. (666,509).—August 2. Capital: £100 in 2s. shares. To acquire the whole or any part of the issued share capital of Elpitiya Rubber Estates Ltd., etc. Regd. office: 13 Rood Lane, E.C.3.

G. & J. Kippax Ltd. (666,244).—July 28: Capital: £10,000 in £1 shares. To carry on the business of distributors, factors and dealers in tyres, etc. The directors are: Geoffrey W. Kippax, Hollins, near Burnley; John W. Kippax, Greystones, Wreatley Lane, near Burnley. Regd. office: 18 High Street, Baldock.

F.C. Plastics Ltd. (F.4931).—August 3. Filed under Section 407 of the Companies Act 1948—Overseas Companies. Capital: £22,000 in 12,000 6 per cent. cumulative preference, 250 'A' ordinary and 9,750 'B' ordinary shares of £1. Registered in Eire on February 8 1940 to manufacture all kinds of waterproof fabrics, rubber, oil, synthetic and chemical proof materials, etc. UK address: 140/142 St. John Street, Clerkenwell, E.C.1. Directors: Edward N. Head, Leixlip House, Leixlip, Co. Kildare; Marie N. Head, Leixlip House, Leixlip, Co. Kildare; David Robertson, 20 Fenchurch Street, E.C.2; Conor Carrigan, Joseph Casey, Francis Casey, Michael Casey and William Sandys.

Print Permanising (666,036).—July 26. Capital: £1,000 in £1 shares. To carry on the business of dealers in and processors of pressure-moulding, and generally operating upon or with natural and synthetic rubber and plastics, printers, etc. The directors are: Stanley G. Maunder, Cherry Tree, West Street, Dormans Land, Lingfield, Surrey; Charles Nixon, 28 Portland Grove, S.W.8.

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on July 27 1960

Plastus S.A. Method of and means for filling bags of thermo weldable material. 842,927.

Lakeside Laboratories Inc. Acetylene compounds and process of preparing same. 842,651.

Ciba Ltd. Process for fixing aminoplasts in the wet state on fibrous materials. 842,402.

Imperial Chemical Industries Ltd. Cutting artificial filaments into short lengths. 842,554.

Imperial Chemical Industries Ltd. Manufacture of cellular polymeric materials. 842,734.

Farbenfabriken Bayer A.G. Process for the production of solid urethane polyisocyanate-urea diisocyanate mixtures and mixtures produced by this process. 842,338.

Farbenfabriken Bayer A.G. Process for for the production of cross-linked plastics of high molecular weight. 842,339.

E. I. Du Pont de Nemours and Co. Manufacture of polyethylene structure and coatings. 842,556.

Esso Research and Engineering Co. Chemical modification of isoolefin-multiolefin copolymers. 842,557.

Plax Corporation. Coated polyalkylene containers. 842,905.

Allied Chemical Corporation, formerly Allied Chemical and Dye Corporation. Continuous method for production of glass fibre reinforced unsaturated alkyl moulding compounds. 842,466.

Farbenfabriken Bayer A.G. Process for the production of polyamides. 842,576.

Farbenfabriken Bayer A.G. Age-resisters for plastics containing urethane groups. 842,271.

Imperial Chemical Industries Ltd. Polymeric materials. 842,663.

Standard Oil Co. Polystyrene production. 842,665.

Onderzoekingstituut Research N.V. Apparatus for feeding particles of fusible polymers to a melting grid. 842,758.

Farbenfabriken Bayer A.G. Polycarbonates and a process for the production thereof. 842,759.

Allied Chemical Corporation, formerly Allied Chemical and Dye Corporation. Unsaturated alkyd moulding compositions and moulded products therefrom. 842,760.

Argus Chemical Corporation. Polyethylene. 842,761.

Dow Chemical Co. Conjoint halogenation technique for polyolefines. 842,763.

American Cyanamid Co. Process of treating non-fibrous regenerated cellulose film. 842,667.

Enbee Products (London) Ltd. Device for welding plastic sheet material. 842,585.

Distillers Co. Ltd. Production of cumene hydroperoxide. 842,586.

Soc. des Usines Chimques Rhone-Poulenc. Rolling and stacking of flexible synthetic resin sheets. 842,776.

E. I. Du Pont de Nemours and Co. Polyester film-forming process. 842,777.

Dow Chemical Co. Process for the catalyzed abnormal addition of hydrogen sulphide to unsaturated compounds. 842,277.

E. I. Du Pont de Nemours and Co. Production of heat-resistant non-woven fibrous webs. 842,496.

Quaker Chemical Products Corporation. Modified polyacetals. 842,279.

L. Hermann and H. Pasche. Butt welding of plastic covered members. 842,782.

Kanthal AB. Formation of corrosion-resistant metallic coatings by so-called flame-spraying techniques. 842,280.

Dow Chemical Co. Hydrophilic interpolymers of polymerizable ethylenically unsaturated compounds and sulpho esters of α-methylene carboxylic acids. 842,563.

Badische Anilin- and Soda-Fabrik A.G. Process for the production of polymer dispersions which are stable to frost and electrolytes. 842,672.

Midland Silicones Ltd. Organosilicon compounds. 842,674.

Vereinigte Glanzstoff-Fabriken A.G. Process for the manufacture of polyamides which are delustered or which contain pigments. 842,675.

Dow Chemical Co. Transparent moulding compositions. 842,405.

The glass fibre shell of this modern style helmet is vacuum covered with a new plastic foil—Novon 504—made by I.C.I. (Hyde) Ltd. Manufacturers are Helmets Ltd., of Wheathampstead, Herts.

Manufactures des Glaces et Produits Chimiques de Saint-Gobain, Chauny and Cirey S.A. Des. Process and apparatus for carrying out mass polymerization. 842,690.

A. Abbey (Dow Chemical Co.). Process for the polymerization of olefin oxides with ferric compounds. 842,427.

United States Rubber Co. Belt and gear drive. 842,428.

Polymer Corporation. Coating process. 842,950.

E. I. Du Pont de Nemours and Co. Production of silane. 842,825.

Farbenfabriken Bayer A.G. Process for the polymerization of unsaturated compounds. 842,341.

Soc. des Usines Chimiques Rhone-Poulenc. Compositions based on α-methylstyrene. 842,841.

Wacker-Chemie G.m.b.H. Manufacture of acetylene and chlorinated hydrocarbons. 842,539.

K. Beyer-Olsen and O. Steffenssen. Apparatus for moulding hollow bodies of plastic. 842,347.

Solvic S.A. Polymerization process. 842,846.

E. I. Du Pont de Nemours and Co. Process for the production of polyester films. 842,778.

Increases of Capital

Lancaster Rubber Co. Ltd. (478,189), Castle Works, Castle Hill, Lancaster.—Increased on January 15 1960 by £3,000, in £1 ordinary shares beyond the registered capital of £5,000.

County Court Judgments

NOTE.—*These Judgments which are supplied from the Registry of County Court Judgments, Lord Chancellor's Department, 3 Dean's Yard, London, S.W.1, are not necessarily for debt, and some may have since been satisfied. They may be for damages or otherwise, they may relate to actions bona fide contested between the parties, or they may be against defendants liable in a representative capacity and not personally; but no distinction is made on the register. A judgment does not imply inability to pay. Judgments are not returned to the Registry if satisfied in Court Books within twenty-one days.*

SOUTHERN BATTERY AND TYRE CO., 20 Park Road, Southampton, Hants. Southampton, £30 19s. 2d., May 30 1960.

A. AND G. PLASTICS LTD., r/o Mumby's Yard, Gosport, Hants. Westminster, £49 1s. 10d., May 30 1960.

W. BUCKLEY, trading as Oxford Plastics, 13 Green Place, Vicarage Road, Oxford. Clerkenwell, £20 1s. 1d., May 16 1960.

Latest Wills

Mr John Howard Wilfred Jarman, of 37 Chestnut Drive, Erdington, Birmingham, late Chief Engineer (Sales) of Tufnol Ltd., Perry Barr, Birmingham, who died on April 10, left £8,704 gross, £8,494 net value.

Mr Bertram Park Wood, of 10 Partridge Drive, Lilliput, Poole, Dorset, late of Bingley, Yorks., and Burnley, formerly for many years sales representative in Lancashire for the Keighley firm of Ondura Ltd., who died on March 24, left £9,653 gross, £9,566 net value.

Mr George Eric Teale, of 240 Clifton Drive South, St. Annes-on-Sea, Lancs., formerly of Malaya, late a director of Strathmore Rubber Co. Ltd., Selangor Oil Palm Co. Ltd., Scottish Malayan Estates, Ltd., and Jugra Land and Carey Ltd., and former chairman of Klanang Produce Co. Ltd., who died on April 11, left estate in the UK valued at £18,764 gross, £18,668 net value.

Mr Franklin Scott Gibbings, of 2 Rue Bosio, Monaco, formerly of Dunlop Rubber Co., who died on February 13, left estate in England worth £2,062.

Mr Joseph Gorman, of 28 St. Anthony Road, Cardiff, managing director of Gorman Tyres Ltd., Cardiff, who died on March 21, intestate, left £5,377 gross, £3,302 net value.

Changes of Name

Leyton Tyre and Rubber Co. Ltd. (240,579). 817/819 Lea Bridge Road, E.17.—Name changed to LTR Distributors Ltd. on January 28 1960.

Extrusionwork Ltd. (572,586). Wellington Mill, Bolton Road, Blackburn.—Name changed to Hawk Plastics Ltd., on February 4 1960.

Variplast Ltd. (642,315). Manufacturers of and dealers in plastic articles, etc., 61 Portland Place, W.1.—Name changed to Sussex Laminations Ltd., on February 29 1960.

R·J·I·P

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(462)

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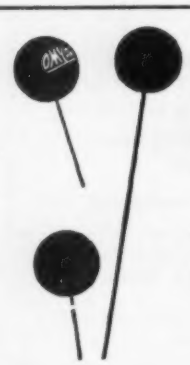

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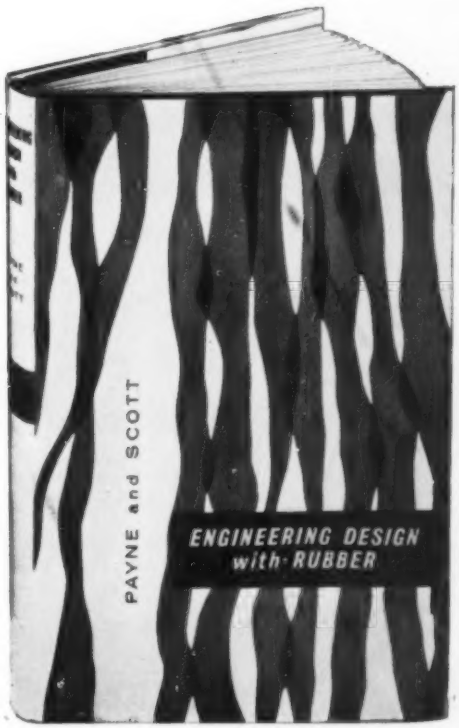

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